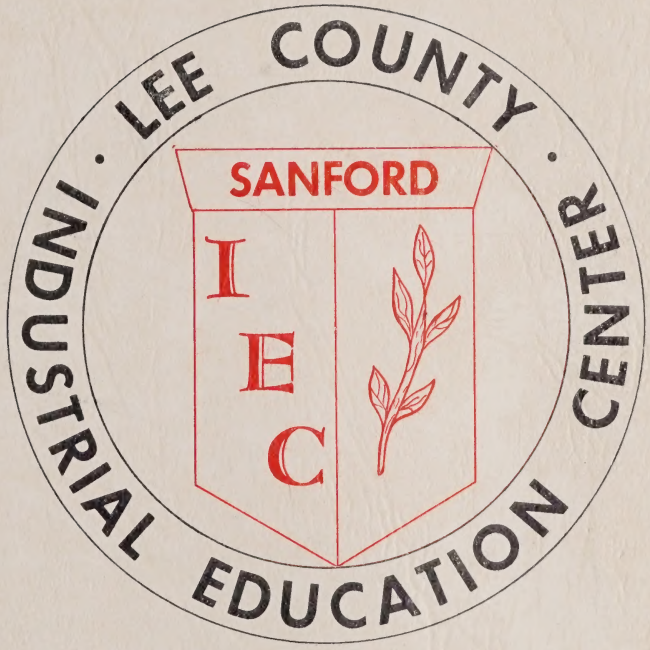

1964-1965
CATALOGUE

SCHOOL CALENDAR

1964 - 1965

(All dates inclusive)
(55 days per quarter)

FALL QUARTER

Registration ..... September 1-2
Classes Begin ..... September 3
Classes End ..... November 20
Holidays:
Labor Day ..... September 7
NCEA, one day, in October, to be announced .....

WINTER QUARTER

Registration ..... November 23 - 24
Classes Begin ..... November 25
Classes End ..... February 25, 1965
Holidays:
Thanksgiving ..... November 26 - 27
Christmas ..... December 21 - 31
New Years Day ..... January 1, 1965

SPRING QUARTER

Registration ..... February 26
March 1
Classes Begin ..... March 2
Classes End ..... May 19
Holidays:
Easter ..... April 16 - 19

SUMMER SESSION

Registration ..... May 20 - 21
Classes Begin ..... May 24
Classes End ..... August 13
Holidays:
Vacation ..... July 5 - 9

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ADMINISTRATION

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Mr. Richard Suddarth ..... Automotive Mechanics

Mr. George I. Resseguie ..... Agriculture Business Related Subjects

Mr. D. O. Jones ..... Machine Shop

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Mrs. Hampton Price ..... Librarian

Mrs. Ruth W. Trodgon ..... Secretary-Bookkeeper

Miss Judith M. Riddle ..... Secretary-Records

Walter C. Petty ..... Janitor

THE CENTER

The Lee County Industrial Education Center is a State Board of Education approved vocational technical school which is operated jointly by a Board of Trustees, and the North Carolina State Department of Community Colleges. 28,000 square feet of shop, laboratory and classroom space are located on a twenty-six acre site, on Kelly Drive near Sanford Central High School. Modern equipment, a large library, a highly trained instructional staff and an experienced administrative group provide optimum training in a variety of technical and trade programs. Completed in August, 1962, the first class matriculated September 17, 1962.

AIMS OF THE CENTER

The purpose of the Lee County Industrial Education Center is threefold:

1. To prepare young men and women to meet specific job requirements for initial employment.
2. To provide vocational or technical education for employed men or women who wish to advance in their jobs.
3. To enable our citizens to acquire occupational skills which contribute to social, economic and cultural growth.

ADMISSION REQUIREMENTS

GENERAL ADMISSION REQUIREMENTS:

As a general policy, as set up by the State Board of Education, the Industrial Education Center is responsible for vocational-technical education for adults "beyond the high school."

An adult is defined as:

1. A person who has completed high school.

2. A person who has attained the age of twenty-one (21) who withdrew from high school prior to graduation.

3. "A person with special needs."

   "A person with special needs" is defined as a public school drop-out from eighteen (18) to twenty-one (21) years of age whose educational needs cannot be met properly in the public school program.

SPECIFIC ADMISSION REQUIREMENTS:

Trade-curriculum. A candidate for admission to the regular trade-vocational training programs must meet the following qualifications:

1. Must have the ability to enter into or make advancement in the area in which enrolled

2. Must demonstrate aptitude for trade-vocational training as determined by standard and/or institution tests to insure ability to meet job requirements in the desired trade.

3. Must have one (1) unit of secondary school algebra or an equivalent in modern mathematics. Those who have deficiencies will be required to remove the deficiency before completing their training.

4. Must have a personal interview with designated school representative.

5. Must be in acceptable condition of physical and mental health to meet qualifications for a given occupation.

Technician-curriculum. Requirements for admission of a candidate to the regular two-year technology program include the following qualifications. The candidate:

1. Must be a high school graduate or have a State approved equivalent education.

2. Must have high school credit for two units of mathematics, one of which is in algebra and the other in plane geometry or an equivalent in modern mathematics. Competence may be determined by appropriate tests. Those who fail to meet the accepted standards for technical mathematics will be required to complete successfully a prerequisite mathematics course to remove the deficiency. A student with deficiencies may be admitted only when there is strong indication of probable success.

3. Should have completed one unit of physical science with laboratory.

4. Must submit the transcripts of high school and post-high school education.

5. Must demonstrate aptitude for technician training as determined by standard tests. These tests will aid in student selection, placement, and guidance. Institution guidance and counseling will be available to the student throughout his education, not just at the time of his enrollment.

6. Must be in acceptable condition of physical and mental health. Medical examination may be required at the discretion of the administration.

7. Must have an interview with a designated representative for discussing enrollment plans and lifetime career goals.

Admission Procedures - curriculum students. Those interested in being admitted to the Center should make formal application to the administrative office. A referral slip will direct the applicant to the North Carolina Employment Security Commission for administration of appropriate aptitude tests. High school transcripts should be forwarded to the Center - this is a responsibility of the applicant. After receipt of these data and upon completion of an interview at the Center, a selection will be made. Selected students will be notified by letter and must then return their acknowledged-admission card together with a $2.00 registration fee within ten days from date of notification. The notification letter will advise the date for registration at which time the student's copy of the admissions card will be surrendered. The $2.00 registration fee and application records are not refundable.

Registration and Tuition - curriculum students.

Registration Fees:

Each student enrolled full-time or part-time in a State Board of Education approved curriculum of one or two years in length shall be charged an annual registration fee of $2.00 at the initial registration following July 1 of each year. The registration fee will be charged only once during any fiscal year. No portion of the registration fee will be refunded.

Tuition Fees:

Each student enrolled full-time or part-time in a State Board of Education approved curriculum of one or two years in length shall be charged a tuition fee of $2.00 per quarter credit hour for which the student is enrolled; provided, the maximum tuition charge shall be $30.00 per quarter.

GRADING SYSTEM

Grades will be issued to students every six weeks. Students will be graded on the acquirement of technical skills, ability to work under supervision, interest in work, initiative, and the ability to apply related information.

Students enrolled in either the school of Technology or the school of Trades will be graded by the following system.

A	95 - 100	Excellent
B	85 - 94	Above Average
C	75 - 84	Average
D	70 - 74	Passing
F	Below 70	Unsatisfactory
I		Incomplete

Incomplete: Assigned when a student is unable to complete his work for any cause. An "incomplete" must be removed within the first six weeks of the next term in which the student is enrolled. Otherwise, the grade becomes an automatic "F".

ADDITIONAL COUNSELING AND TESTING

As mentioned under admission procedure, all applicants will be required to be subjected to a series of aptitude tests. This will be accomplished prior to acceptance and registration. The counselor will schedule interviews with students concerning interpretation of their test scores and he will advise students concerning course selections. Additional aptitude tests may be desirable to determine individual ability. Applicants are not encouraged to enroll unless it is believed that the student has made a sound choice and that he will profit from his choice.

Students are encouraged to use the counseling services at any time. The counseling service will work at all times with individuals to keep them informed of the progress they are making. Also, many reference materials are made available to students during the training program through the counseling service.

CONTACT HOURS AND CREDIT HOURS

The curriculums are offered on the basis of an average load of twenty-five contact hours per five-day week, eleven weeks per quarter. Students enrolled in a part-time program will be scheduled, based on class needs, to accomplish this average load, but over a longer period of time.

Quarterly credit hours are awarded to students on the following arrangement:

Credit of one quarter hour for each hour of class work per week for eleven weeks. The average hour of class will require two hours of assigned homework, for an average student.

Credit of one quarter hour for each two hours of laboratory work per week for eleven weeks. One hour of assigned homework will accompany an average laboratory period of two hours.

Credit of one quarter hour for each three hours of manipulative laboratory for eleven weeks. No outside work will ordinarily be assigned to accompany this shop period. Manipulative laboratories will be indicated by an asterisk.

The following definitions will explain the foregoing terms:

"Class work" is lecture and other classroom instruction.

"Laboratory" involves demonstration by instructor, experimentation and practice by students.

"Manipulative laboratory" involves development of manual skills and job proficiency.

C U R R I C U L U M

TRADE

Automotive Mechanics	4 Quarters *
Farm Machinery	4 Quarters *
Heating, Air-Conditioning & Refrigeration	4 Quarters *
Machinist	4 Quarters *
Mechanical Drafting	4 Quarters *
Radio & Television Servicing	4 Quarters *
Welding	4 Quarters *
Practical Nurse Education	4 Quarters *

TECHNICIAN

Agricultural Technology - Business	6 Quarters *
Electronics Technology	6 Quarters *
Mechanical Technology - Drafting & Design	6 Quarters *
Mechanical Technology - Production	6 Quarters *

*Based on full time attendance

Note: Students pursuing a curriculum for less than full time should expect to attend school for a longer duration.

REFUNDS

Funds paid in by the student are refundable only under the following conditions:

Registration - If the class is not inaugurated

Books - If books are not received by student

Tuition - On a pro-rata basis; i.e., on basis of actual days attended

Insurance - If money has not been forwarded to Insurance Company

TRANSFER CREDIT

Full credit will be given for educational work accomplished at another North Carolina Industrial Education Center. Such accomplishments at another type of institution may be credited for pre-requisite purposes only.

CLASS ATTENDANCE

No more than three class cuts will be allowed during a quarter. Extended absences will be dealt with on an individual basis, but make-up work will be required in all such cases. It is essential that students be in class on time.

TRADE CURRICULUM

AUTOMOTIVE MECHANICS

PURPOSE OF CURRICULUM

This curriculum provides a training program for developing the basic knowledge and skills needed to inspect, diagnose, repair or adjust automotive vehicles. Manual skills are developed in practical shop work. Thorough understanding of the operating principles involved in the modern automobile comes in class assignments, discussion, and shop practice.

JOB DESCRIPTION

Automobile mechanics maintain and repair mechanical, electrical, and body parts of passenger cars, trucks, and buses. In some communities and rural areas they also may service tractors or marine engines and other gasoline-powered equipment. Mechanics inspect and test to determine the causes of faulty operation. They repair or replace defective parts to restore the vehicle or machine to proper operating condition. They use shop manuals and other technical publications.

AUTOMOTIVE MECHANICS

Course Title			COURSE HOURS PER WEEK			QUARTER HOURS CREDIT
FIRST QUARTER			CLASS	LAB.	SHOP PRAC.	
AUTO	121	Automotive Engines	3	0	12	7
MA	120	Fundamentals of Mathematics	5	0	0	5
ENG	101	Reading Improvement	2	0	0	2
PHY	104	Applied Physics I	1	2	0	2
			11	2	12	16
SECOND QUARTER						
AUTO	122	Automotive Electrical and Fuel Systems	3	0	12	7
PHY	105	Applied Physics II	1	2	0	2
ENG	102	Communication Skills	2	0	0	2
DD	121	Blueprint Reading	3	0	0	3
			9	2	12	14
THIRD QUARTER						
AUTO	123	Automotive Chassis and Suspensions	3	0	12	7
AHR	101	Automotive Air Conditioning	3	0	0	3
SOC	101	Human Relations	2	0	0	2
MECH	112	Welding	0	0	3	1
PHY	106	Applied Physics III	1	2	0	2
			9	2	15	15
FOURTH QUARTER						
AUTO	124	Automotive Power Train Systems	3	0	9	6
SOC	103	Management Procedures	3	0	0	3
AUTO	125	Automotive Servicing	3	0	9	6
			9	0	18	15

AUTOMOTIVE MECHANICS

COURSE DESCRIPTIONS

AUTO 121 Automotive Engines

Development of a thorough knowledge and ability in using, maintaining, and storing the various hand tools and measuring devices needed in automotive repair work. Study of the construction and operation of components of automotive engines. Testing of engine performance; servicing and maintenance of pistions, valves, cams and camshafts, fuel and exhaust systems, cooling systems; proper lubrication; and methods of testing, diagnosing and repairing.
Prerequisite: None.

MA 120 Fundamentals of Mathematics

Practical number theory. Analysis of basic operations: addition, subtraction, multiplication and devision. Fractions, decimals, powers and roots, percentages, ratio and proportion. Plane and solid geometric figures used in industry; measurement of surfaces and volumes. Introduction to algebra used in trades. Practice in depth.
Prerequisite: None.

ENG 101 Reading Improvement

A concentrated effort to improve the student's ability to comprehend what he reads by training him to read more rapidly and accurately. Special machines are used for class drill to broaden the span of recognition, to increase eye coordination and work group recognition, and to train for comprehension in larger units. Reading faults of the individual are analyzed for improvement, and principles of vocabulary building are stressed.
Prerequisite: None.

PHY 104 Applied Physics 1

Introductory physics and its applications. Systems of measurement, theory of matter, properties of solids, liquids, and gases.
Prerequisite: None.

AUTO 122 Automotive Electrical and Fuel Systems

A thorough study of the electrical and fuel systems of the automobile. Battery cranking mechanism, generator, ignition, accessories and wiring; fuel pumps, carburetors, and fuel injectors. Characteristics of fuels, types of fuel systems, special tools, and testing equipment for the fuel and electrical system.
Prerequisite: AUTO 121.

PHY 105 Applied Physics II

Basic principles of electricity, types of electricity, and its production, transmission, and transformation. Such factors as the electron theory, electrical measurement, magnetism, electromagnetism, and the magnetic effects of electricity constititute major areas of study.
Prerequisite: PHY 104.

ENG 102 Communication Skills

Development of ability to communicate effectively through the medium of good language usage in speaking and writing. Organizing thoughts, and presenting thoughts effectively in connection with problems.
Prerequisite: None.

DD 121 Blueprint Reading

Interpretation and reading of blueprints. Development of ability to read and interpret blueprints, charts, instruction and service manuals, and wiring diagrams. Information on the basic principles of lines, views, dimensioning procedures, and notes.
Prerequisite: None.

AUTO 123 Automotive Chassis and Suspensions

Principles and functions of the components of automotive chassis. Practical job instruction in adjusting and repairing of suspension, steering and braking systems. Units to be studied will be shock absorbers, springs, steering systems, steering linkage, front end, types and servicing of brakes.
Prerequisite: AUTO 122.

AHR 101 Automotive Air Conditioning

General introduction to the principles of refrigeration; study of the assembly of the components and connections necessary in the mechanisms, the methods of operation, and control; proper handling of refrigerants in charging the system.
Prerequisite: PHY 105.

SOC 101 Human Relations

Development of understanding of relationships to other persons through some of the basic principles of human psychology. The problems of the individual and his work situation are studied in relation to the established organization of modern business and industry and in relation to government practices and labor organization, with special emphasis on the operating responsibilities of good management.
Prerequisite: None.

MECH 112 Welding

Welding demonstrations by the instructor and practice by students in the welding shop. Safe and correct methods of assembling and operating the welding equipment. Practice will be given for surface welding; bronze welding, silver-soldering, and flame cutting methods applicable to mechanical repair work.
Prerequisite: None

PHY 106 Applied Physics 111

Physical principles of force, energy, work and power; equilibrium and the laws of motion; principles of machines, mechanical advantage, and transmission of power in practical applications and the use of vectors and graphical presentations.
Prerequisites: PHY 104, MA 120.

AUTO 124 Automotive Power Train Systems

Principles and functions of automotive power train systems: clutches, transmission gears, torque converters, drive shaft assemblies, rear axles and differentials. Identification of troubles, servicing, and repair.
Prerequisites: PHY 105, PHY 106, AUTO 123.

SOC 103 Management Procedures

An introduction to the business world, problems of small business operation, basic business law, business forms and records, financial problems, ordering and inventorying, layout of equipment and offices, methods of improving business, and employer-employee relations.
Prerequisite: None.

AUTO 125 Automotive Servicing

Emphasis is on the shop procedures necessary in determining the nature of troubles developed in the various component systems of the automobile. Troubleshooting of automotive systems, providing a full range of testing, adjusting, repairing and replacing experiences.
Prerequisite: AUTO 123.

FARM MACHINERY MECHANICS

PURPOSE OF CURRICULUM

The history of the development and introduction of farm machinery is largely the history of what we call "modern civilization." The introduction of tools to cultivate the soil and lighten the labor of the farmer was immediately reflected in an improvement of the standard of living. The major factor in this growth and development has been the replacement of horsepower by power developed from gasoline and electricity.

This program is organized to provide a broad training to permit entrance into the field best suited to the interest and aptitude of the graduate. Emphasis is placed on the basic fundamental theory and related laboratory and shop techniques with specialization to be developed later in employment.

JOB DESCRIPTION

Graduates of this program can quickly adapt themselves for employment in the areas of sales, service, distribution, installation and maintenance. They may estimate cost and plan equipment installations or provide the service that must be done, not in the factory, but in the field, and done by personnel who thoroughly understand the problems of the farmer-purchaser.

They will make inspections and tests to determine the causes of faulty operation, and repair or replace defective parts to restore the tractor or other gasoline-powered equipment to proper operating condition. They may occasionally be called upon to render service on other types of equipment such as pumps and sprayers, barn and dairy equipment, ventilation and electrical equipment found on the farm.

FARM MACHINERY

FARM MACHINERY MECHANICS

Course Title	COURSE HOURS PER WEEK			QUARTER HOURS CREDIT
FIRST QUARTER	CLASS	LAB	SHOP PRAC.	
AG 110 Farm Machinery Engines	3	0	12	7
MA 120 Fundamentals of Mathematics	5	0	0	5
ENG 101 Reading Improvement	2	0	0	2
PHY 104 Applied Physics I	1	2	0	2
	11	2	12	16
SECOND QUARTER				
AG 111 Farm Machinery Electrical Systems	3	0	12	7
DD 121 Blueprint Reading	3	0	0	3
ENG 102 Communication Skills	2	0	0	2
PHY 105 Applied Physics II	1	2	0	2
WELD 121 Welding	1	0	3	2
	10	2	15	16
THIRD QUARTER				
AG 112 Farm Machinery Fuels and Fuel Systems	2	0	9	5
AG 113 Farm Machinery Hydraulics	3	0	12	7
PHY 106 Applied Physics III	1	2	0	2
	6	2	21	14
FOURTH QUARTER				
AG 114 Farm Machinery Power Train	2	0	6	4
AG 115 Farm Machinery Suspensions and Implements	2	0	3	3
SOC 101 Human Relations	2	0	0	2
SOC 103 Management Procedures	3	0	0	3
AG 116 Farm Machinery Service and Repair	2	0	6	4
	11	0	15	16

FARM MACHINERY MECHANICS

COURSE DESCRIPTIONS

AG 110 Farm Machinery Engines

An introduction to farm machinery. Tractor and other farm machinery engines maintenance including: shop procedures, safety, repair tools, tune-up and engine testing equipment. Study of the construction and operation of components of farm equipment engines. Testing of engine performance; servicing and maintenance of pistons, valves, cams and camshafts, fuel and exhaust systems, cooling systems; proper lubrication; and methods of testing, diagnosing and repairing.
Prerequisite: None.

MA 120 Fundamentals of Mathematics

Practical number theory. Analysis of basic operations: addition, subtraction, multiplication and division. Fractions, decimals, powers and roots, percentages, ratio and proportion. Plane and solid geometric figures used in industry; measurement of surfaces and volumes. Introduction to algebra used in trades. Practice in depth.
Prerequisite: None.

ENG 101 Reading Improvement

A concentrated effort to improve the student's ability to comprehend what he reads by training him to read more rapidly and accurately. Special machines are used for class drill to broaden the span of recognition, to increase eye coordination and work group recognition, and to train for comprehension in larger units. Reading faults of the individual are analyzed for improvement, and principles of vocabulary building are stressed.
Prerequisite: None.

PHY 104 Applied Physics 1

Introductory physics and its applications. Systems of measurement, theory of matter, properties of solids, liquids, and gases.
Prerequisite: None.

AG 111 Farm Machinery Electrical Systems

Intensive training in components and operation of tractor electrical systems. Fundamentals of electricity and magnetism and their application to tractor engine electrical systems; batteries, ignition systems, cranking motors, generators and regulators.
Prerequisite: AG 110.

DD 121 Blueprint Reading

Interpretation and reading of blueprints. Development of ability to read and interpret blueprints, charts, instruction and service manuals, and wiring diagrams. Information on the basic principles of lines, views, dimensioning procedures, and notes.
Prerequisite: None.

ENG 102 Communication Skills

Development of ability to communicate effectively through the medium of good language usage in speaking and writing. Organizing thoughts, and presenting thoughts effectively in connection with problems.
Prerequisite: None.

PHY 105 Applied Physics 11

Basic principles of electricity, types of electricity, and its production, transmission, and transformation. Such factors as the electron theory, electrical measurement, magnetism, electromagnetism, and the magnetic effects of electricity constitute major areas of study.
Prerequisite: PHY 105.

WELD 121 Welding

The various processes used for joining materials by welding are discussed. Lecture, demonstrations and practice cover the oxyacetylene and arc welding processes, filler metals used, gases, currents, weldability of metals. Instruction is given in the set-up and safe operation of oxyacetylene welding apparatus. Students prepare joints by both hand and machine cutting with the oxyacetylene torch.
Prerequisite: None.

AG 112 Farm Machinery Fuels and Fuel Systems

A thorough study of fuels and fuel systems of gasoline and diesel tractors. Characteristics of fuels, principles and fundamentals of combustion, carburetion, fuel injection, and engine speed governing.
Prerequisite: AG 110.

AG 113 Farm Machinery Hydraulics

A concentrated investigation of tractor hydraulic systems consisting of hydraulic principles and components of various hydraulic systems. Hydrostatics, basic circuits, fluids, hydrodynamics and automatic draft control. Identification of trouble, servicing, and repair.
Prerequisite: AG 110.

PHY 106 Applied Physics 111

Physical principles of force, energy, work and power; equilibrium and the laws of motion; principles of machines, mechanical advantage, and transmission of power in practical applications and the use of vectors and graphical presentations.
Prerequisites: PHY 104, MA 120.

AG 114 Farm Machinery Power Train Systems

Principles and functions of tractor power train systems: clutches, bearings, shafts, and cases, gears and gear trains, differentials, final drives, and planetary systems.
Prerequisite: AG 110.

AG 115 Farm Machinery Suspensions and Implements

Principles and functions of the components of tractor suspensions. Practical instruction in adjustment and repair of suspension, steering, braking, and hitching systems.

Assembly, adjustment, operation, maintenance and repair of tractor-drawn and mounted equipment. Students will receive instruction in principles of operation and diagnosis and correction of troubles in tillage, planting and seeding, pest control and harvesting equipment.
Prerequisite: AG 110.

SOC 101 Human Relations

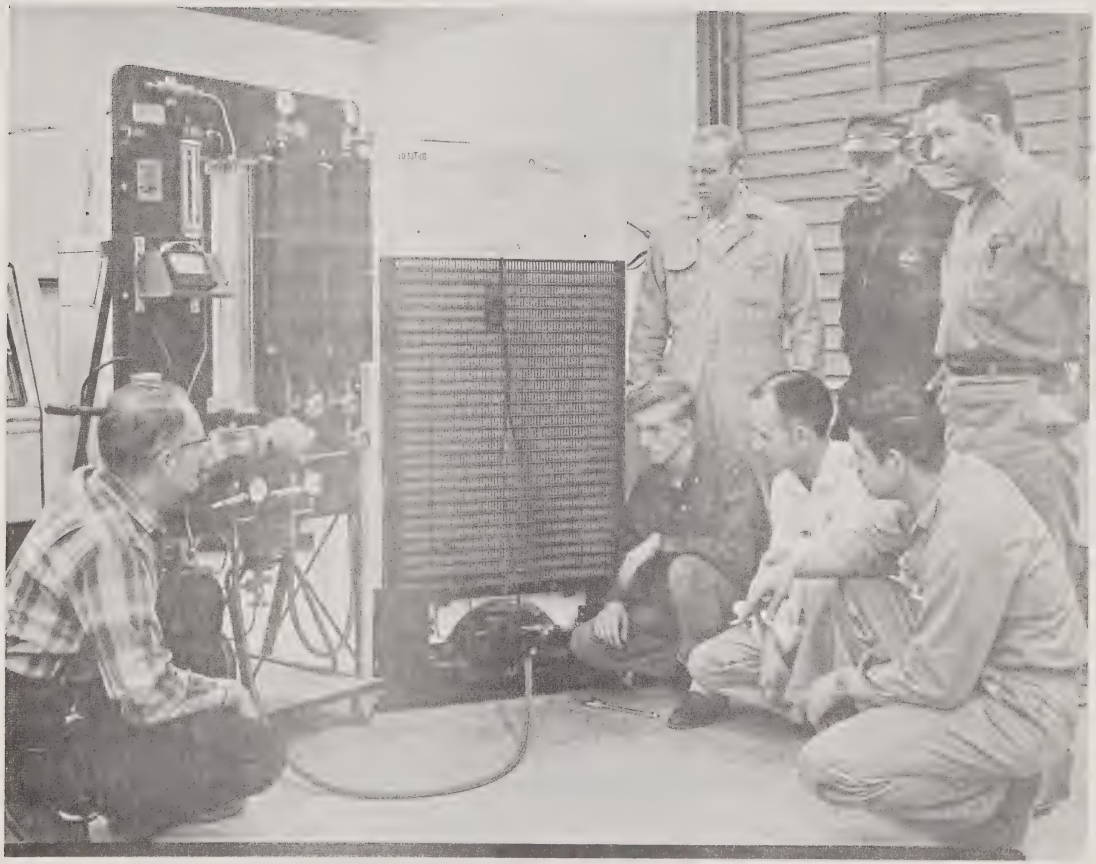
Development of understanding of relationships to other persons through some of the basic principles of human psychology. The problems of the individual and his work situation are studied in relation to the established organization of modern business and industry and in relation to government practices and labor organization, with special emphasis on the operating responsibilities of good management.
Prerequisite: None.

SOC 103 Management Procedures

An introduction to the business world, problems of small business operation, basic business law, business forms and records, financial problems, ordering and inventorying, layout of equipment and offices, methods of improving business, and employer-employee relations.
Prerequisite: None.

AG 116 Farm Machinery Service and Repair

Opportunity for the student to practice principles and techniques learned in previous courses by means of service and repair work that can be made available. A close simulation to an actual farm machinery shop situation will be maintained, and effort will be made to give the student a full range of testing and servicing experience under both shop and field conditions.
Prerequisite: AG 110.



HEATING, AIR-CONDITIONING & REFRIGERATION

HEATING, AIR-CONDITIONING AND REFRIGERATION:

PURPOSE OF CURRICULUM

This curriculum guide provides a training program for the instruction of students in the basic knowledges and skills involved in servicing and installing heating, air-conditioning and refrigeration equipment. Manual skills are emphasized in practical shop work combined with a thorough understanding of the operating principles involved in heating, air-conditioning and refrigeration.

JOB DESCRIPTION

The heating, air-conditioning and refrigeration mechanic installs, services and repairs equipment used in the heating and cooling of domestic buildings, industrial buildings and mobile-type units. In general, a person will perform similar duties in any one of these fields, but often becomes a specialist in one. The mechanic uses blueprints and schematics, thus requiring a knowledge of blueprint reading. He services, installs and maintains commercial and domestic refrigeration components, heating devices, air and liquid flow devices used in comfort heating of air and liquids, and fuel storage units. The duties may involve mechanical repairs, electrical motor repairs, control wiring, electrical and gas tests, pipe and tubing fitting, duct and fitting fabrication, equipment installation, shop sketching of equipment and flow devices for installations, and equipment sizing.

HEATING, AIR-CONDITIONING AND REFRIGERATION:

Course Title	COURSE HOURS PER WEEK			QUARTER HOURS CREDIT
FIRST QUARTER	CLASS	LAB	SHOP PRAC.	
AHR 121 Elements of Refrigeration	5	0	9	8
ELEC 117 Basic Electricity	3	0	0	3
DD 122 Blueprint Reading	5	0	0	5
MA 124 Algebra	5	0	0	5
WELD 112 Welding	0	0	3	1
	18	0	12	22
SECOND QUARTER				
AHR 122 Air-Conditioning & Refrigeration	5	0	9	8
ELEC 118 Applied Electricity	2	2	0	3
MA 120 Plane Geometry	3	0	0	3
AHR 125 Principles of Air-Conditioning	5	0	0	5
DD 123 Blueprint Reading	1	0	3	2
	16	2	12	21
THIRD QUARTER				
AHR 123 Air-Conditioning & Refrigeration	5	0	9	8
AHR 126 All Year Comfort Systems	3	0	6	5
AHR 128 Automatic Controls	2	2	0	3
SOC 104 Sales and Communication	2	0	0	2
	12	2	15	18
FOURTH QUARTER				
AHR 124 Air-Conditioning & Refrigeration	3	0	9	6
AHR 127 All Year Comfort Systems	3	0	3	4
MECH 120 Sheet Metal & Duct Fabrication	3	0	6	5
SOC 103 Management Procedures	3	0	0	3
	12	0	18	18

HEATING, AIR-CONDITIONING AND REFRIGERATION

COURSE DESCRIPTION

AHR 101 Automotive Air Conditioning

General introduction to the principles of refrigeration; study of the assembly of the components and connections necessary in the mechanisms, the methods of operation and control; proper handling of refrigerants in charging the system.

AHR 121 Elements of Refrigeration

Essential terminology, laws of refrigeration, heat and the methods of heat transfer, the compression system, compressors and their construction, refrigerant controls, temperature controls, refrigerants and their characteristics, pressure-temperature relationships, tube bending, flaring, swaging, identification of fittings, soldering, use of special test and service equipment, vacuum pumps and micron gages.

AHR 122 AC and Refrigeration

Refrigeration service practice on domestic and commercial systems using conventional, hermetic and absorption systems. Cabinet care, controls, accessories, coils, control valves, methods of installation, removal, replacement, trouble-shooting and repair are emphasized.

AHR 123 AC and Refrigeration

Practice in computing system loads, equipment sizing and balancing, and the use of charts and tables pertaining to refrigeration equipment.

AHR 124 AC and Refrigeration

Practices in time and material take-off from job drawings and specifications are studied. Methods of calculating overhead and other operating costs are discussed and their relationship to labor and material cost is considered in preparing true-cost estimates. The student will prepare true-cost estimates of refrigeration and cooling systems.

AHR 125 Principles of Air Conditioning

The history, theory and factors covering air conditioning are studied. Instruction will include air conditioning terminology, temperature measurement, air movement, humidity, psychometric properties, comfort zones, effective temperature, duct systems, air diffusion, air cleaning zone, testing instruments and heat loads.

AHR 126 All Year Comfort Systems

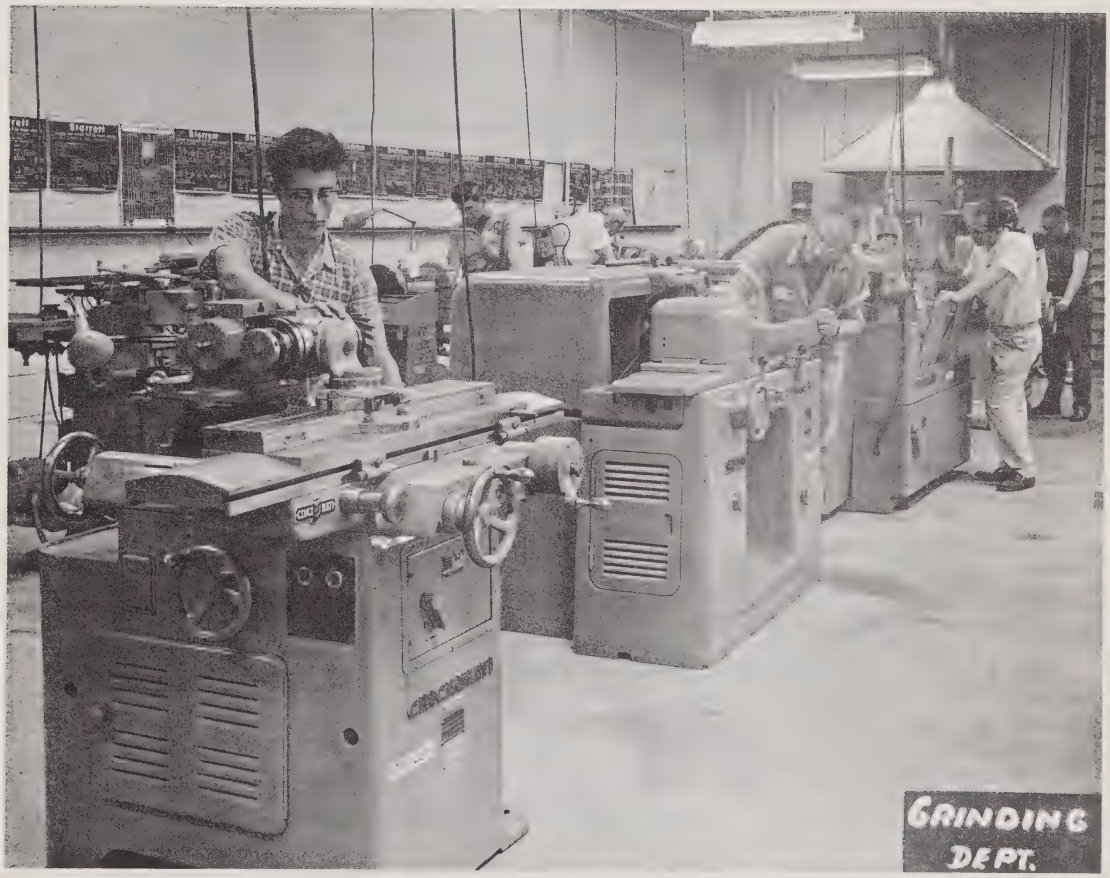
The student studies and receives practice in installing, maintaining, servicing and repairing, oil and gas burners, electrical heating elements and controls. Basic principles of installing and servicing hot water and low pressure steam boiler controls, pumps and coils are covered and installation using this equipment are made.

AHR 127 All Year Comfort Systems

The student will plan, lay-out develop, fabricate, install prepare estimates and submit bids for complete duct systems for heating and air conditioning systems. Heat loss and distribution will be calculated and systems will be selected for different buildings.

AHR 128 Automatic Controls

Types of automatic controls and their functions. Included in the course will be electric and pneumatic controls for domestic and commercial cooling and heating; zone controls; unit heater and ventilator controls; commercial fan system controls; commercial refrigeration controls and radiant panel controls.



MACHINIST

MACHINIST TRADE

PURPOSE OF CURRICULUM

This curriculum is designed to give learners the opportunity to acquire basic skills and the related technical information necessary to gain employment and build a profitable career in the machine shop industry in the State.

JOB DESCRIPTION

The machinist is a skilled metal worker who shapes metal parts by using machine tools and hand tools. His training and experience enables him to plan and carry through all the operations needed in turning out a machined product and to switch readily from one kind of product to another. A machinist is able to select the proper tools and material required for each job and to plan the cutting and finishing operations in their proper order so that he can complete the finished work according to blueprint or written specifications.

MACHINIST TRADE

Course Title	COURSE HOURS PER WEEK			QUARTER HOURS CREDIT
FIRST QUARTER	CLASS	LAB	SHOP PRAC.	
MECH 121 Machine Shop Theory and Practice	3	0	12	7
MA 120 Fundamentals of Mathematics	5	0	0	5
DD 122 Blueprint Reading	5	0	0	5
ENG 101 Reading Improvement	2	0	0	2
	15	0	12	19
SECOND QUARTER				
MECH 122 Machine Shop Theory and Practice	3	0	12	7
MA 123 Machinist Mathematics	5	0	0	5
DD 123 Blueprint Reading	3	0	0	3
PHY 104 Applied Physics I	1	2	0	2
ENG 102 Communication Skills	2	0	0	2
	14	2	12	19
THIRD QUARTER				
MECH 123 Machine Shop Theory and Practice	3	0	12	7
MECH 124 Structure of Metals	3	2	0	4
PHY 105 Applied Physics II	1	2	0	2
SOC 101 Human Relations	2	0	0	2
	9	4	12	15
FOURTH QUARTER				
MECH 125 Machine Shop Theory and Practice	3	0	12	7
ISC 101 Industrial Specifications	2	0	0	2
MECH 111 Oxyacetylene Welding	2	0	3	3
MECH 126 Heat Treating Practice	0	0	3	1
ISC 102 Industrial Organizations	3	0	0	3
	10	0	18	16

COURSE DESCRIPTIONS

MECH 121 Machine Shop Theory and Practice

An introduction to the machinist trade and the potential it holds for the craftsman. Deals primarily with the identification, care and use of basic hand tools and precision measuring instruments. Elementary layout procedures and processes of lathe, drill press, grinding (off-hand) and milling machines will be introduced both in theory and practice.
Prerequisite: None.

MA 120 Fundamentals of Mathematics

Practical number theory. Analysis of basic operations: addition, subtraction, multiplication and division. Fractions, decimals, powers and roots, percentages, ratio and proportion. Plane and solid geometric figures used in industry; measurement of surfaces and volumes. Introduction to algebra used in trades. Practice in depth.
Prerequisite: None.

DD 122 Blueprint Reading

Interpretation and reading of blueprints. Information on the basic principles of the blueprint; lines, views, dimensioning procedures and notes.
Prerequisite: None.

ENG 101 Reading Improvement

A concentrated effort to improve the student's ability to comprehend what he reads by training him to read more rapidly and accurately. Special machines are used for class drill to broaden the span of recognition, to increase eye coordination and word group recognition, and to train for comprehension in larger units. Reading faults of the individual are analyzed for improvement, and principles of vocabulary building are stressed.
Prerequisite: None.

MECH 122 Machine Shop Theory and Practice

Advanced operations in layout tools and procedures, power sawing, drill press, surface grinder, milling machine and shaper. The student will be introduced to the basic operations on the cylindrical grinder and will select projects encompassing all the operations, tools and procedures thus far used and those to be stressed throughout the course.
Prerequisite: MECH 121.

MA 123 Machinist Mathematics

Fundamental geometric concepts and construction of plane and solid figures, surface and volume measurements, and related problems; introduction to trigonometry of the right triangle, Introduces gear ratio, lead screw and indexing problems with emphasis on application to the machine shop. Practical applications and problems furnish the trainee with experience in geometric propositions and trigonometric relations to shop problems; concludes with an introduction to compound angle problems.
Prerequisite: MA 120.

DD 123 Blueprint Reading

Further practice in interpretation of blueprints as they are used in industry; study of prints supplied by industry; making plans of operations; introduction to drafting room procedures; sketching as a means of passing on ideas, information and processes.
Prerequisite: DD 122.

PHY 104 Applied Physics 1

Introductory physics and its applications. Systems of measurement, theory of matter, properties of solids, liquids, and gases.
Prerequisite: None.

ENG 102 Communication Skills

Development of ability to communicate effectively through the medium of good language usage in speaking and writing. Organizing thoughts, and presenting thoughts effectively in connection with problems.
Prerequisite: None.

MECH 123 Machine Shop Theory and Practice

Advanced work on the engine lathe, turning, boring and threading machines, grinders, milling machine and shaper. Introduction to basic indexing and terminology with additional processes on calculating, cutting and measuring of spur, helical, and worn gears and wheels. The trainee will use precision tools and measuring instruments such as vernier height gages, protractors, comparators, etc. Basic exercises will be given on the turret lathe and on the tool and cutter grinder.
Prerequisites: MECH 121, MECH 122.

MECH 124 Structure of Metals

Elementary and practical approach to metals, their structure, markings, classifications and uses. Interpretation of properties and specifications of steels by use of manuals, catalogs, charts, etc.
Prerequisite: None.

PHY 105 Applied Physics 11

Basic principles of electricity, types of electricity, and its production, transmission, and transformation. Such factors as the electron theory, electrical measurement, magnetism, electromagnetism, and the magnetic effects of electricity constitute major areas of study.
Prerequisite: PHY 104.

SOC 101 Human Relations

Development of understanding of relationships to other persons through some of the basic principles of human psychology. The problems of the individual and his work situation are studied in relation to the established organization of modern business and industry and in relation to government practices and labor organization, with special emphasis on the operating responsibilities of good management.
Prerequisite: None.

MECH 125 Machine Shop Theory and Practice

Development of class projects using previously learned procedures in planning, blueprint reading, machine operations, final assembly and inspection. Additional processes on the turret lathe, tool and cutter grinder, cylindrical and surface grinder, advanced milling machine operations, etc.. Special procedures and operations, processes and equipment, observing safety procedures faithfully and establishing of good work habits and attitudes acceptable to the industry.
Prerequisites: MECH 121, MECH 122, MECH 123.

ISc 101 Industrial Specifications

Organizing and studying machine tool and hand tool specifications, job sheets and procedure sheets. Catalogs, specification sheets, and manufacturer's handbooks serve as reference sources.
Prerequisite: None.

MECH 111 Oxyacetylene Welding

Basic welding procedures and practice. The trainee will gain experience in the gas welding of small parts and tools. This course will present gas welding as it may be used by the machinist in the repair and manufacture of tools and equipment.
Prerequisite: None.

MECH 126 Heat Treating Practice

Working knowledge of the methods of treating ferrous and nonferrous metals. The effects of hardening, tempering, and annealing upon the structure and physical properties of metals. Trainees will be given the opportunity to acquaint themselves with the equipment and processes of heat treating.
Prerequisite: MECH 124.

ISc 102 Industrial Organizations

Methods, techniques, and practices of modern management in planning, organizing and controlling operations of a manufacturing concern. Introduction to the competitive system and the factors constituting product cost.
Prerequisite: None.

MECHANICAL DRAFTING

PURPOSE OF CURRICULUM

This curriculum is designed to prepare students to enter the field of mechanical drafting. The first two quarters contain courses basic to all fields of drafting. The third and fourth quarters contain specialization and related courses that prepare one to enter mechanical drafting occupations.

JOB DESCRIPTION

Draftsman prepares clear, complete, and accurate working plans and detail drawings, from rough or detailed sketches or notes for engineering or manufacutring purposes, according to the specified dimensions. Mechanical Draftsman performs duties of draftsman but specializes in making rought drafting sketches of proposed mechanical devices, and then drawing necessary details. Prepares accurate scale drawings of parts or machines from specifications.

MECHANICAL DRAFTING

MECHANICAL DRAFTING

Course Title	COURSE HOURS PER WEEK			QUARTER HOURS CREDIT
FIRST QUARTER	CLASS	LAB	SHOP PRAC.	
DD 131 Drafting	3	0	12	7
MA 121 Geometry	3	0	0	3
ENG 101 Reading Improvement	2	0	0	2
PHY 104 Applied Physics I	1	2	0	2
DD 105 Drafting Analysis	2	0	0	2
	11	2	12	16
SECOND QUARTER				
DD 132 Drafting	3	0	12	7
MA 124 Algebra	5	0	0	5
ENG 102 Communication Skills	2	0	0	2
PHY 105 Applied Physics II	1	2	0	2
DD 135 Descriptive Geometry	1	4	0	3
	12	6	12	19
THIRD QUARTER				
DD 171 Mechanical Drafting	3	0	12	7
MA 126 Trigonometry	3	0	0	3
PHY 106 Applied Physics III	1	2	0	2
MECH 113 Shop Processes	2	2	0	3
MECH 115 Metallurgy	2	2	0	3
	11	6	12	18
FOURTH QUARTER				
DD 172 Mechanical Drafting	3	0	12	7
SOC 101 Human Relations	2	0	0	2
ISC 102 Industrial Organizations	3	0	0	3
MECH 114 Shop Processes	2	2	0	3
MECH 116 Metallurgy	2	2	0	3
	12	4	12	18

COURSE DESCRIPTIONS

DD 131 Drafting

An introduction to drafting and the study of drafting practices. Instruction is given in the selection, use and care of instruments, singlestroke lettering, applied geometry, freehand sketching consisting of orthographic and pictorial drawings. Orthographic projection, reading and instrument drawing of principal views, single auxiliary views (primary), and double (oblique) auxiliary views will be emphasized. Dimensioning and note practices will be studied with reference to the American Standards Association practices. Methods of reproducing drawings will be included at the appropriate time.
Prerequisite: None.

MA 121 Geometry

Fundamental properties and definitions; plane and solid geometric figures, selected general theorems, geometric construction of lines, angles and plane figures. Diehdral angles, areas of plane figures, volumes of solids. Geometric principles are applied to shop operations.
Prerequisite: None

ENG 101 Reading Improvement

A concentrated effort to improve the student's ability to comprehend what he reads by training him to read more rapidly and accurately. Special machines are used for class drill to broaden the span of recognition, to increase eye coordination and work group recognition, and to train for comprehension in larger units. Reading faults of the individual are analyzed for improvement, and principles of vocabulary building are stressed.
Prerequisite: None.

PHY 104 Applied Physics 1

Introductory physics and its applications. Systems of measurement, theory of matter, properties of solids, liquids, and gases.
Prerequisite: None.

DD 105 Drafting Analysis

The trainee will make an analysis of the various drafting field options offered in the Center. This analysis will include selected reading assignments concerning the options. A study of the job descriptions concerning those areas in the Dictionary of Occupational Titles, a study of blueprints in the option fields, and preparation of sketches illustrating major differences in the types of drawings.
Prerequisite; None.

DD 132 Drafting

The trainee will study simple and successive revolutions and their applications to practical problems. Sections and conventions will be studied and both detail and assembly sections will be drawn. Intersections and developments will be studied by relating the drawing to the sheet metal trades. Models of the assigned drawings will be made from construction paper, cardboard, or similar materials as a proof of the solution to the problems drawn.
Prerequisite: None.

Methods of drawing and projecting axonometric, oblique, and perspective drawings will be studied with emphasis on the practical applications of pictorial drawings. Various methods of shading will be introduced and dimensioning and sectioning of oblique and axonometric pictorials will be done.
Prerequisite: DD 131.

MA 124 Algebra

Basic concepts and operations of algebra: historical background of our base-10 number system; algebraic operations: addition, subtraction, multiplication and division; fractions, letter representation, grouping, factoring, ratio and proportions, variation; graphical and algebraic solution of first degree equations; solution of simultaneous equations by: addition and subtraction, substitution, graphing; exponents, logarithms, tables and interpolation.
Prerequisite: None.

ENG 102 Communication Skills

Development of ability to communicate effectively through the medium of good language usage in speaking and writing. Organizing thoughts, and presenting thoughts effectively in connection with problems.
Prerequisite: None

PHY 105 Applied Physics 11

Basic principles of electricity, types of electricity, and its production, transmission and transformation. Such factors as the electron theory, electrical measurement, magnetism, electromagnetism, and the magnetic effects of electricity constitute major areas of study.
Prerequisite: PHY 104.

DD 135 Descriptive Geometry

Graphical analysis of space problems. The problems deal with practical design elements involving points, lines, planes, connectors, and a combination of these. Included are problems dealing with solid geometry theorems. Where applicable, each graphical solution shall be accompanied by the analytical solution.
Prerequisite: DD 131.

DD 171 Mechanical Drafting

An introduction to mechanical drafting beginning with problems concerning precision and limit dimensioning. Methods of fastening materials, and fasteners: keys, rivets, springs, and welding. Symbols will be studied and drawings will be made involving these items. Principles of design will be introduced with the study of basic mechanisms of motion transfer; gears, cams, power trains, pulleys, belting and methods of specifying and calculating dimensions will be studied. Drawings will be made involving these mechanisms.
Prerequisite: DD 132.

MA 126 Trigonometry

Trigonometric ratios; solving problems with right triangles; using tables, and interpolating; solution of oblique triangles using law of sines and law of cosines; graphs of the trigonometric functions; inverse functions, trigonometric equations. All topics are applied to practical problems.
Prerequisites: MA 121, MA 124.

PHY 106 Applied Physics 111

Physical principles of force, energy, work and power; equilibrium and the laws of motion; principles of machines, mechanical advantage, and tranmission of power in practical applications and the use of vectors and graphical presentations.
Prerequisite: PHY 104.

MECH 113 Shop Processes

Study of practices used in metalworking shops: introduction to how materials can be utilized, and to the processes of shaping, forming and fabricating of metals. Demonstration of the metalworking lathes, grinders, drills, milling machines, shapers, planers, saws, broachers, gear cutting machines and finishing machines. A study of the capabilities of these machines.
Prerequisite: None.

MECH 115 Metallurgy

Investigates the properties of ferrous metals and tests to determine their uses. Instructions will include some chemical metallurgy to provide a background for the understanding of the physical changes and causes of these changes in metals. Physical metallurgy of ferrous metals, producing iron and steel, theory of alloys, shaping and forming, heat treatments for steel, surface treatments, alloy of special steel, classification of steels, and cast iron will be topics for study.
Prerequisite: None.

DD 172 Mechanical Drafting

Principles of design sketching, design drawings, layout drafting, detailing from layout darwings, production drawings and simplified drafting practices constitute areas of study. Forging and casting drawings will be made from layouts. Specifications, parts list and bill of materials are emphasized in this course. The student will develop a complete set of working drawings of a tool, jig, fixture or simple machine and learn principles of design, handbook and manual usage.
Prerequisite: DD 171.

SOC 101 Human Relations

Development of understanding of relationships to other persons through some of the basic principles of human psychology. The problems of the individual and his work situation are studied in relation to the established organization of modern business and industry and in relation to government practices and labor organization, with special emphasis on the operating responsibilities of good management.
Prerequisite: None.

ISc 102 Industrial Organizations

Methods, techniques, and practices of modern management in planning, organizing and controlling operations of a manufacturing concern. Introduction to the competitive system and the factors constituting product cost.
Prerequisite: None.

MECH 114 Shop Processes

Comparison of the unit-production and mass-production systems. Casting, forging and allied processes, welding and sheet metal working processes are demonstrated and discussed. Mass-production methods are studied in relationship to precision dimensional control.
Prerequisite: MECH 113.

MECH 116 Metallurgy

Continuation of the study of physical metallurgy. The non-ferrous metals; bearing metals (brass, bronze, lead) light metals (aluminum and magnesium) and copper and its alloys are studied. Powder metallurgy, titanium, zirconium, indium and vanadium are included in this course.
Prerequisite: MECH 115.

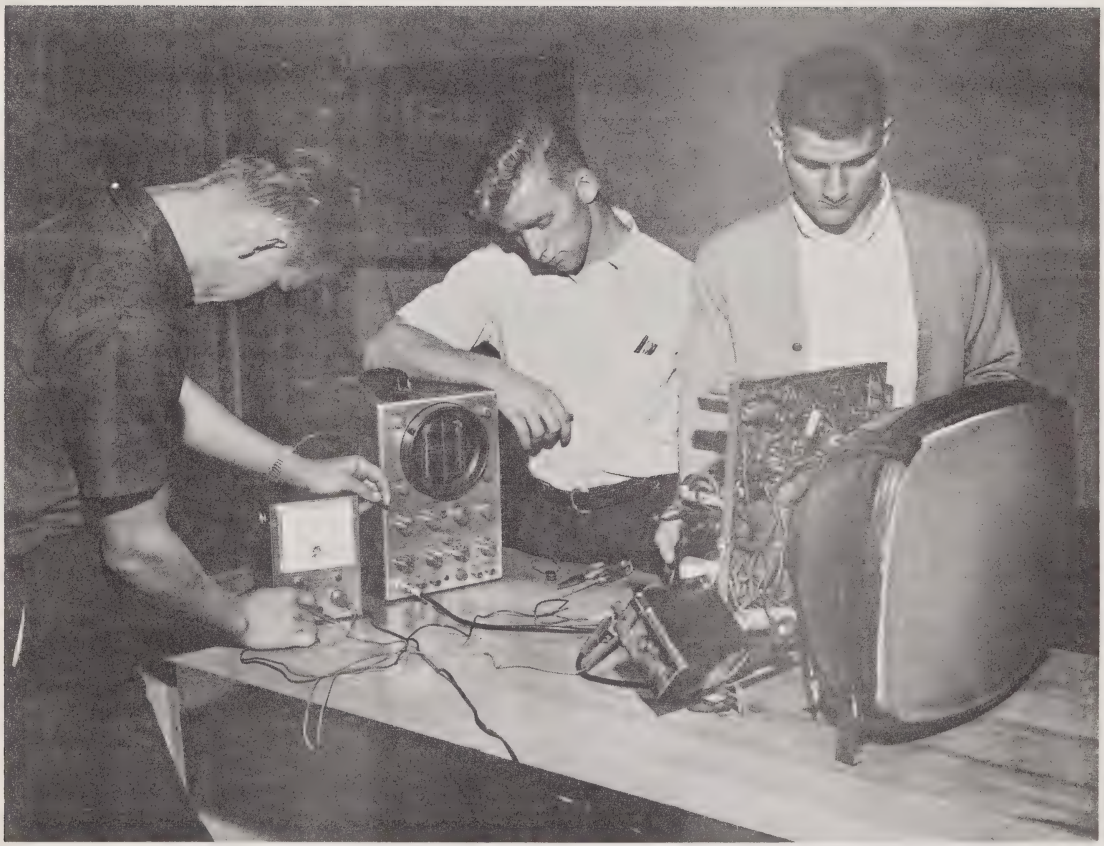
RADIO AND TELEVISION SERVICING

PURPOSE OF CURRICULUM

This curriculum provides a training program which will provide the basic knowledge and skills involved in the installation, maintenance and servicing of radio, television and sound amplifier system. A large portion of time is spent in the laboratory verifying electronic principles and developing servicing techniques.

JOB DESCRIPTION

A radio and television serviceman may be required to install, maintain and service amplitude modulated and frequency modulated home and auto radios, transistorized radios, monochrome and color television sets, intercommunication, public address and paging systems, high fidelity and stereophonic amplifiers, record players and tape recorders.



RADIO & TELEVISION SERVICING

RADIO AND TELEVISION SERVICING

Course Title	COURSE HOURS PER WEEK			QUARTER HOURS CREDIT
FIRST QUARTER	CLASS	LAB	SHOP PRAC.	
MA 125 Electrical Mathematics	5	0	0	5
ELEC 122 Direct and Alternating Current	7	8	3	12
ENG 101 Reading Improvement	2	0	0	2
	14	8	3	19
SECOND QUARTER				
ELN 122 Vacuum Tubes and Circuits	5	10	0	10
ELN 123 Amplifier Systems	2	0	6	4
ENG 102 Communication Skills	2	0	0	2
SOC 101 Human Relations	2	0	0	2
	11	10	6	18
THIRD QUARTER				
ELN 124 Vacuum Tubes and Circuits	4	4	0	6
ELN 125 Radio Receiver Servicing	2	0	6	4
ELN 126 Transistor Theory and Circuits	5	4	0	7
SOC 103 Management Procedures	3	0	0	3
	14	8	6	20
FOURTH QUARTER				
ELN 127 Television Receiver Circuits and Servicing	10	0	15	15
	10	0	15	15
or				
ELN 128 Television Receiver Circuits and Servicing	5	0	12	9
Elective (1)	5	0	6	7
	10	0	18	16
ELECTIVE				
ELN 129 Single Side-band Systems	5	0	6	7
ELN 130 Two-way Mobile Maintenance	5	0	6	7

RADIO AND TELEVISION SERVICING

COURSE DESCRIPTIONS

MA 125 Electrical Mathematics

An introductory algebra course with trigonometry and vectors needed in alternating current: algebraic operations of addition, subtraction, multiplication and division; use of letters and signs, grouping, factoring; exponents, ratios and proportions; algebraic and graphic solutions of first-degree equations; introduction to trigonometric functions, their graphs and applications to right triangles. Addition, subtraction and resolution of vector quantities.
Prerequisite: None.

ELEC 122 Direct and Alternating Current

A study of the structure of matter and the electron theory, the relationship between voltage, current and resistance in series, parallel and series-parallel circuits. Analysis of direct current circuits by Ohm's law and Kirchhoff's law; sources of direct current potentials. Fundamental concepts of alternating current flow; a study of reactance, impedance, phase angle, power and resonance and alternating current circuit analysis.
Prerequisite: None.

ENG 101 Reading Improvement

A concentrated effort to improve the student's ability to comprehend what he reads by training him to read more rapidly and accurately. Special machines are used for class drill to broaden the span of recognition, to increase eye coordination and word group recognition, and to train for comprehension in larger units. Reading faults of the individual are analyzed for improvement, and principles of vocabulary building are stressed.
Prerequisite: None.

ELN 122 Vacuum Tubes and Circuits

An introduction to vacuum tubes and their development; the theory, characteristics and operation of vacuum diodes, semi-conductor diodes, rectifier circuits, filter circuits, triodes and simple voltage amplifier circuits.
Prerequisite: ELEC 122, MA 125.

ELN 123 Amplifier Systems

An introduction of commonly used servicing techniques as applied to monophonic and stereophonic high fidelity amplifier systems and auxiliary equipment. The operation and servicing of inter-communication amplifiers and switching circuits will also be taught.
Prerequisites: MA 125, ELEC 122.

ENG 102 Communication Skills

Development of ability to communicate effectively through the medium of good language usage in speaking and writing. Organizing thoughts, and presenting thoughts effectively in connection with problems.
Prerequisite: None.

SOC 101 Human Relations

Development of understanding of relationships to other persons through some of the basic principles of human psychology. The problems of the individual and his work situation are studied in relation to the established organization of modern business and industry and in relation to government practices and labor organization, with special emphasis on the operating responsibilities of good management.
Prerequisite: None.

ELN 124 Vacuum Tubes and Circuits

A continuing study of tubes and circuits; the theory, characteristics, and operation of the tetrode and pentode tubes, voltage and power amplifiers, tunable RF amplifiers, oscillators and demodulator circuits.
Prerequisites: ELN 123, ELN 122.

ELN 125 Radio Receiver Servicing

Principles of radio reception and practices of servicing; included are block diagrams of radio receivers, servicing techniques of AM and FM receivers by resistance measurements, signal injection, voltage analysis, oscilloscope methods of locating faulty stages and components and the alignment of AM and FM receivers.
Prerequisite: ELN 123, ELN 122.

ELN 126 Transistor Theory and Circuits

Transistor theory, operation, characteristics and their application to audio and radio frequency amplifier and oscillator circuits.
Prerequisite: ELN 123.

SOC 103 Management Procedures

An introduction to the business world, problems of small business operation, basic business law, business forms and records, financial problems, ordering and inventorying, layout of equipment and offices, methods of improving business, and employer-employee relations.
Prerequisite: None.

ELN 127 Television Receiver Circuits and Servicing

A study of principles of television receivers, alignment of radio and intermediate frequency amplifiers, adjustment of horizontal and vertical sweep circuits will be taught. Techniques of troubleshooting and repair of TV receivers with the proper use of associated test equipment will be stressed. Additional study of more specialized servicing techniques and oscilloscope waveform analysis will be used in the adjustment, troubleshooting and repair of the color television circuits.
Prerequisites: ELN 126, ELN 125.

ELN 128 Television Receiver Circuits and Servicing

This course, taught in conjunction with an elective, will be a shortened version of ELN 127.
Prerequisites: ELN 126, ELN 125.

ELN 129 Single Side-band Systems

An introductory course of single side-band transmission system with carrier frequency or without and the associated balanced modulator of phasing system used to produce this type of transmission. Time will be allotted also to the necessary circuitry in the receiver to receive this type transmission.
Prerequisites: ELN 126, ELN 125.

ELN 130 Two-way Mobile Maintenance

A course to acquaint the student with the theory and maintenance of fixed station and mobile station transmitters and receivers. Except for radio laws, sufficient information will be given to qualify the student to take the FCC second class radiotelephone license examination.
Prerequisites: ELN 126, ELN 125.

WELDING

WELDING

PURPOSE OF CURRICULUM

The purpose of this course is to provide a sound training program of the skills involved in welding along with a background of technical information needed by the modern welder.

The curriculum is designed to give the student a sound foundation in the principles, practices, and usages of both gas and electric welding in modern industry. At the same time he will be given ample practice in the welding skills. In the shop theory and practice are combined under the guidance of an instructor thoroughly competent in the trade. In addition, instruction is given in the in the technical fields related to welding under the instruction of specialists in the technical fields.

OCCUPATIONAL OPPORTUNITIES

Typical occupational opportunities are found in motor vehicle and equipment plants, air craft industry, construction companies, independent metal working repair shops, steel mills, and self-employment.

WELDING

Course Title		COURSE HOURS PER WEEK			QUARTER HOURS CREDIT
FIRST QUARTER		CLASS	LAB	SHOP PRAC.	
WELD 101	Welding Theory and Practice I	3	0	9	7
WELD 102	Welding Metallurgy	2	0	0	2
DD 107	Blueprint Reading & Sketch	3	0	0	3
ELEC 117	Basic Electricity I	2	0	0	2
MA 109	Applied Mathematics I	2	0	0	2
		12	0	8	16
SECOND QUARTER					
WELD 105	Welding Theory & Practice II	3	0	8	7
WELD 109	Welding Jigs & Fixtures	3	0	0	3
DD 113	Blueprint Reading & Sketch II	3	0	0	3
ENG 102	Communication Skills	2	0	0	2
MA 110	Applied Math II	2	0	0	2
		13	0	8	17
THIRD QUARTER					
WELD 108	Welding Theory & Practice III	3	0	8	7
WELD 113	Pipe Fabrication and Layout	3	0	0	3
DD 114	Blueprint Reading & Sketch III	4	0	0	4
SOC 101	Human Relations	2	0	0	2
		12	0	8	16'

COURSE DESCRIPTIONS

WELD 101 Welding Theory and Practice I

A basic course for the combination welder. Manipulative skills in the use of shielded metal arc and acetylene welding; theory and standard trade practices; joint design and preparation - tacking sequence, brazing, cutting, preheating and silver soldering; welding various thicknesses of metals in the vertical, overhead, overhead and flat positions using both oxyacetylene and metallic arc methods and procedures are covered.

WELD 102 Welding Metallurgy

The metallurgy of welding to include the necessary chemistry and inspection procedures. Types of metals and their manufacture, the structure of metals, mechanical and physical properties, fluxes and slags, wetting action, shrinkage, surface alloying principles, effects of alloying elements, heat treatment, corrosion, metal identification, quality control inspection procedures and electrode classification and selection are included

WELD 105 Welding Theory and Practice II

Structural and sheetmetal welding. Includes welding light and heavy guage materials in any position. Preparation for the passing of qualification tests is emphasized.

WELD 108 Welding Theory and Practice III

Production welding methods and procedures. Metallic arc welding of stainless steels; introduction to tungsten inert gas, aluminum welding, dissimilar metals, use of low hydrogen electrodes, and high alloy steels; joint design, weld preparation, repair procedures, interpass temperature, straightening and precision welding; and specifications and testing are covered.

WELD 109 Welding jigs and fixtures

This course covers control of distortion and alignment, chill bars, backup (purge gas), backup (metal), backup (fluxes), back step, tacking sequence, positioners, cooling agents, pre-heat, run-off tabs, presetting, surface plates and vee blocks, precision measuring equipment, clamping, finished surface protection, supports, design of jigs and fixtures, and manufacturing jigs and fixtures.

WELD 111 Oxyacetylene Welding

Demonstration by the instructor and practice by the student in the welding shop. Theory and correct methods of assembly and operating the welding outfit will be emphasized. Practice will be given in surface welding, bronze welding, sodering, brazing and flame cutting methods applicable to mechanical repair.

WELD 112 Welding

A general course in oxyacetylene and metallic arc welding with applications to the automotive and heating, air conditionning and refrigeration fields.

WELD 113 Pipe Fabrication and Layout

Forehand and backhand welding of pipe in the vertical and bellhole positions. Cutting, beveling, fit-up, joint preparation, piping symbols, fabrication, installation procedures, valves, expansion joints, cold spring, expansion factors, brazing, silver soldering, layout techniques, welding of pressure piping, circle burning and finding data will be covered.

WELD 121 Welding

The various processes used for joining materials by welding are discussed. Lecture, demonstrations and practice cover the oxyacetylene and arc-welding processes, filler metals used, gases, currents, weldability of metals. Instruction is given in the set-up and safe operation of oxyacetylene welding apparatus. Students prepare joints by both hand and machine cutting with the oxyacetylene torch.

WELD 122 Welding

Continuation of WELD 121 with practice given in arc-welding using AC transformer and DC motor generator welding machines. A study is made of the correct welding heats, polarities and electrodes to use when welding various materials and alloys.

PRACTICAL NURSE EDUCATION

PRACTICAL NURSE EDUCATION

PURPOSE OF CURRICULUM

The aim of the Practical Nurse Education Program is to make available to qualified persons the opportunity to prepare for participation in care of patients of all ages, in various stages of dependency, and with a variety of illness conditions.

SELECTION OF STUDENTS

Students are selected on the basis of demonstrated aptitude for nursing as determined by pre-entrance tests, interviews with faculty members, high school record, character references, and reports of medical and dental examination.

JOB DESCRIPTION

Throughout the one-year program the student is expected to grow continously in acquisition of knowledge and understandings related to nursing, the biological sciences, the social sciences and in the skills related to nursing practice, communications, interpersonal relations, and the use of good judgment. Evaluation of student performance consists of tests on all phases of course content, evaluation of clinical performance, and evaluation of adjustment to the responsibilities of nursing. A passing score is required on all graded work, plus demonstrated progress in the application of nursing skills to actual patient care.

GRADUATES

Graduates of accredited programs of practical nurse education are eligible to take the licensing examination given by the North Carolina Board of Nurse Registration and Nursing Education, Enlarged. This examination is given twice each year, usually in April and September. A passing score entitles the individual to receive a license and to use the legal title "Licensed Practical Nurse." The license must be renewed annually. The Licensed Practical Nurse can apply for licensure in other states on the basis of a satisfactory examination score, without repeating the examination.

PRACTICAL NURSE EDUCATION

PN-101 PRACTICAL NURSING 1: Fundamentals of Practical Nursing

COURSE MATERIAL:

Nursing - History
Introduction to patient care
Administration of medicines

Health - Personal, physical and mental
Family
Community

Basic Science - Body structure and function
Bacteriology
Basic nutrition

Vocational Adjustments - Introduction to ethics
Introduction to legal aspects of nursing

Communications in Human Relations

Classroom activities are planned to assist the student in the development of knowledge, understanding, appreciations, and the attitudes basic to effective nursing of patients of all ages and bsckgrounds with nursing needs arising both from the individuality of the patient and from inability for self-care as a result of a health deviation. The student is encouraged to develop beginning skills in analysis of patient needs, both through classroom study of hypothetical patient situations and through planned patient experiences in the clinical environment. Beginning skills in nursing methods are developed through planned laboratory experiences, followed by related practice in actual patient care.

Clinical activities provide introduction to actual patient care through selected clinical assignments requiring the application of current classroom and laboratory learnings.

PRACTICAL NURSE EDUCATION

PN-102 PRACTICAL NURSING 11: Care of Patients with Medical-Surgical Conditions

COURSE MATERIAL: Medical-Surgical Nursing - Patient care
Diet Therapy
Medications

Emergency and Disaster Nursing

Communications and Human Relations

Classroom activities center around analysis of nursing needs arising from the illness and/or surgical procedure, as viewed in perspective with the needs arising from the individuality of the patient. Related information is presented as it is relevant to the student's understanding of and ability to meet nursing needs of patients.

Clinical activities provide selected experiences in patient care in order for the student to develop skill in applying classroom learnings to a variety of patient situations.

PN-103 PRACTICAL NURSING 111: Care of the Maternity Patient and Newborn infant

COURSE MATERIAL: Principles of Obstetrical Nursing

Nutrition in Pregnancy and infancy

Medications

Communications and Human Relations

Classroom activities center around analysis of nursing needs of the antepartum and post-partum patients and the normal newborn infant. Basic knowledge of obstetrics and related areas is presented as it is relevant to the student's ability to function effectively in recognizing and meeting patient needs.

Clinical activities consist of guided experiences in nursing maternity patients and newborn infants and is planned to parallel classroom learnings.

PRACTICAL NURSE EDUCATION

PN-104 PRACTICAL NURSING IV: Care of the Sick Child

COURSE MATERIAL: Growth and development

Principles from Pediatric Nursing

Medications

Nutrition and Diet therapy

Classroom activities center around the needs of children of all ages, the effects of illness on the needs of the child, and the nursing principles to be applied to the care of the sick child.

Clinical activities consist of guided experiences in the care of children with a variety of common illness conditions requiring medical and/or surgical treatment and is planned to parallel classroom learnings whenever possible.

PN-105 PRACTICAL NURSING V: Vocational Adjustments for the Practical Nurse

COURSE MATERIAL: Vocational Adjustments - Nursing ethics
Legal aspects of nursing
Nursing organizations

Job relations

Classroom activities center around experiences designed to promote appreciation for the attitudes and behaviors which will assist the student to adapt to the role of Graduate Practical Nurse and to the expectations of the employing agency.

PRACTICAL NURSE EDUCATION

COURSE DESCRIPTION

PN-101 PRACTICAL NURSING I: Fundamentals of Practical Nursing

To offer the beginning student in practical nursing the opportunity to acquire basic knowledge from nursing and from related areas of learning and to begin to develop the skills needed for safe and effective bedside care of patients whose health deviation has created a state of dependency in matters of daily living.

PREREQUISITE: Admission to a Program of Practical Nurse Education approved by the North Carolina Department of Community Colleges and/or accredited by the North Carolina Board of Nurse Registration and Nursing Education, Enlarged.

PN-102 PRACTICAL NURSING II: Care of patients with Medical-Surgical Conditions

To offer the practical nursing student opportunities to acquire the basic knowledge and understanding and to further develop the skills needed for rendering safe and effective nursing care to adolescent and adult patients with common illness conditions requiring medical and/or surgical treatment.

PREREQUISITE: Practical Nursing I

PN-103 PRACTICAL NURSING III: Care of the Maternity Patient and Newborn Infant

To offer the practical nursing student opportunities to acquire basic knowledge of pregnancy, labor and delivery, the puerperium, and the neonatal period and to develop beginning skills in rendering safe and effective nursing care to maternity patients and newborn infants.

PREREQUISITE: Practical Nursing I

PN-104 PRACTICAL NURSING IV: Care of the Sick Child

To offer the practical nursing student opportunities to acquire basic knowledge concerning the needs of normal, healthy children, the effects of illness on children, and the nursing needs of children of all ages with a variety of common illnesses and to develop beginning skills in recognizing and meeting the nursing needs of the hospitalized child.

PREREQUISITE: Practical Nursing I.

PN-105 PRACTICAL NURSING V: Vocational Adjustments for the Practical Nurse

To offer the advanced practical nursing student opportunities to prepare for the transition from the student role to that of Graduate Practical Nurse.

PREREQUISITE: Practical Nursing I, II, III, AND IV.

TECHNICIAN CURRICULUM

AGRICULTURE TECHNOLOGY - BUSINESS

AGRICULTURAL TECHNOLOGY - BUSINESS

PURPOSE OF CURRICULUM

The Agricultural Technology-Business Curriculum is designed to help students acquire knowledge, understandings, and abilities in the broad field of agricultural business. It combines knowledge of agriculture with business training to prepare the graduate for one of the many varied employment opportunities in agricultural business. The specific objectives of the Agricultural Business Curriculum are to develop the following student competencies:

1. Understanding of the principles of organization and management in agricultural businesses, industries and farm operations.
2. Understanding of the basic principles of our economic system, marketing, credit, price concepts and governmental policies and programs relating to agriculture.
3. Understandings and skill in effective communication for agricultural business.

JOB DESCRIPTION

As agricultural business and industry firms expand in size and number they are experiencing rapid changes in technologies of production, sales, and management, in an increasingly competitive environment. Future employees of such firms must be prepared to understand these changes and adapt themselves accordingly. Successful completion of this curriculum should enable a person to assume responsibilities in an agricultural firm and should enable him to advance within such a business.

Upon graduation from this curriculum an individual should qualify for various jobs in agricultural business and industry such as salesman or store manager in farm supply stores; agricultural field serviceman; salesman, demonstrator or plant manager of feed and food companies; farm products inspector; salesman, or office managers of farm products marketing firms.

AGRICULTURAL BUSINESS

Course Title			COURSE HOURS PER WEEK		QUARTER HOURS CREDIT
FIRST QUARTER			CLASS	LAB.	
BUS	311	Business Mathematics	3	0	3
ENG	301	Communicative Skills: Reading Improvement	2	0	2
AG	370	Animal Science	5	2	7
AG	310	Introduction to Agricultural Economics	5	2	6
			15	4	17
SECOND QUARTER					
BUS	320	Accounting	5	2	7
ENG	302	Communicative Skills: English	3	0	3
AG	312	Agricultural Marketing	5	2	6
AG	420	Plant Science	5	2	6
			18	6	21
THIRD QUARTER					
BUS	321	Accounting	5	2	6
AG	314	Farm Business Management	5	4	7
ENG	303	Communicative Skills: Technical Writing	3	0	3
AG	492	Fertilizers and Lime	3	2	4
			16	8	20

AGRICULTURAL BUSINESS

		Course Title	COURSE HOURS PER WEEK CLASS	LAB.	QUARTER HOURS CREDIT
FOURTH QUARTER					
AG	316	Agricultural Finance	5	2	6
BUS	317	Sales Development	3	2	4
BUS	326	Business Organization and Operation	3	0	3
ENG	304	Communicative Skills: Speech	2	0	2
		Agriculture or Business: Elective	-	-	5
			13	4	20
FIFTH QUARTER					
AG	306	Farm Chemicals	5	2	6
BUS	318	Business Law	5	0	5
AG	336	Farm Electrification	3	2	4
BUS	310	Written Sales Communications	3	2	4
			16	6	19
SIXTH QUARTER					
SOC	301	Human Relations	2	0	2
AG	326	Agricultural Program and Agencies	3	2	4
BUS	335	Business Management	3	0	3
BUS	309	Business Machines	0	4	2
AG	502	Agricultural Business Practicum	198 Minimum Hours		
		Agriculture or Business Elective	-	-	5
			8	6	22

AGRICULTURAL TECHNOLOGY - BUSINESS

COURSE DESCRIPTION

BUS 311 Business Mathematics

This course stresses the fundamental operations and their application to business problems. Topics covered include payrolls, price marking, interest and discount, commission, insurance, taxes and other pertinent uses of mathematics in the field of business.
Prerequisite: None.

ENG 301 Communicative Skills: Reading Improvement

A concentrated effort to improve the student's ability to comprehend what he reads by training him to read more rapidly and accurately. Special machines are used for class drill to broaden the span of recognition, to increase eye coordination and word group recognition, and to train for comprehension in larger units. Reading faults of the individual are analyzed for improvement, and principles of vocabulary building are stressed.
Prerequisite: None.

AG 370 Animal Science

Basic principles of zoology and genetics as related to farm animals. The scientific study of all commercially important classes of farm animals.
Prerequisite: None.

AG 310 Introduction to Agricultural Economics

An introduction to economics, the functions of the economic system and agriculture's role in the economy. A review of the functions of the manager and an introduction to the principles he uses in making decisions to adjust to changing conditions. Analysis of the main sources of change which affect agricultural firms.
Prerequisite: None.

BUS 320 Accounting

Principles, techniques and tools of accounting, for understanding of the mechanics of accounting - collecting, summarizing, analyzing, and reporting information about service and merchantile enterprises to include practical application of the principles learned.
Prerequisite: None.

ENG 302 Communicative Skills: English

Designed to aid the student in the improvement of self-expression in business and technical composition. The approach is functional with emphasis on grammar, diction, sentence structure, punctuation, and spelling. Intended to stimulate students in applying the basic principles of English grammar in their day-to-day situations in industry and social life.
Prerequisite: None.

AGRICULTURAL TECHNOLOGY - BUSINESS

COURSE DESCRIPTION

AG 312 Agricultural Marketing

An analysis of the functions of marketing in the economy and a survey of the problems marketing faces. A review of the market structure and the relationship of local, terminal, wholesale, retail and foreign markets. Problems in the operations of marketing firms including buying and selling, processing, standradization and grading, risk taking and storage, financing, efficiency, and cooperation. Discussion of procedures of marketing such commodities as grain, cotton, livestock and tobacco.
Prerequisite: AG 310.

AG 420 Plant Science

An introductory general botany and crop science course covering the fundamental principles of the reproduction, growth, functions, and development of seed bearing plants with application to certain commercially important plants in North Carolina.
Prerequisite: None

BUS 321 Accounting

Partnership and corporation accounting including a study of payrolls, Federal and State taxes. Emphasis is placed on the recording, summarizing and interpreting data for management control rather than on bookkeeping skills. Accounting services are shown as they contribute to the recognition and solution of management problems.
Prerequisite: BUS 320.

AG 314 Farm Business Management

A review of the functions of the manager of a business firm and the problems he faces. Development of the concept of planning by both partial and complete budgeting. Review of the concepts of costs and the length of run in production. Practice in preparing enterprise budgets as an aid in choosing what to produce. Use of partial budgeting to find the least cost production procdure. Analysis of production data to select the level of production that yields the most net revenue. Relationship between size, efficiency and income of a farm. Review of procedures for evaluating the efficiency of the manager.
Prerequisite: AG 310.

ENG 303 Communicative Skills: Technical Writing

The fundamentals of English are utilized as a background for the organization and techniques of modern technical writing. Exercises in developing typical technical reports, using writing techniques and graphic devices, are completed by the students. Practical application in the preparation of a full-length technical report is required of each student at the end of the term.
Prerequisite: None.

COURSE DESCRIPTION

AG 492 Fertilizers and Lime

A review of the source, function, and use of the major and minor plant food elements; commercial fertilizer ingredients; soil acidity, liming materials; application of fertilizer and liming materials.
Prerequisite: None.

AG 316 Agricultural Finance

Analysis of the capital structure of modern commercial agriculture with emphasis on the sources of credit. Application of management principles in choosing the amount and kind of credit a farmer should use. A review of lending institutions, repayment schedules, and credit instruments. Practice in the procedure of evaluating farm resources with attention to information needed for resource valuation, appraisal farms and procedures, discounting and depreciation. A review of the historical development of credit programs and institutions in the United States.
Prerequisite: AG 310.

BUS 317 Sales Development

A study of retail, wholesale and speciality selling. Emphasis is placed upon mastering and applying the fundamentals of selling. Preparation for and execution of sales demonstrations required.
Prerequisite: None.

BUS 326 Business Organization and Operation

A study of the legal structures of the various types of business organizations, methods of financing, internal organization and management.
Prerequisite: None.

ENG 304 Communicative Skills: Speech

Technical speech to develop the speaking skills with emphasis on the dual role of communications as both a speaking and listening skill. Stress is placed on growth in poise and confidence of the student. Practice through individual speeches and group discussion. Recordings are made of the student's voice and used as an aid in speech development.
Prerequisite: ENG 302.

AG 306 Farm Chemicals

A study of farm chemical pesticides, their ingredients, formulation, and farm application, with emphasis on the effective and safe use of chemicals in agricultural pest control.
Prerequisite: None.

BUS 318 Business Law

Basic business laws including the law of contracts, negotiable instruments, agency, partnership, corporation, deeds of conveyance, etc., will be covered. A primary objective of the course is to enable the student to know when to consult a professional lawyer.

COURSE DESCRIPTION

AG 336 Farm Electrification

A study of the basic principles and systems used in farm electrification. Application to agricultural production. Emphasis is on equipment for controlling the utilization of electricity.
Prerequisite: None.

BUS 310 Written Sales Communications

Develops skills in techniques in writing business communications. Emphasis is placed on writing action - getting sales letters and prospectuses. Business reports, summaries of business conferences, spot announcements for radio and television as well as letters involving credit, collections, adjustments, complaints, orders, acknowledgements, remittances, and inquire are also included in this course.
Prerequisite: ENG 302.

SOC 301 Human Relations

Principles of interpersonal relations including a consideration of motivation, feelings, emotions, and learning with reference to their applications to on-the-job situations; personal and group dynamics and self-adjustment.
Prerequisite: None.

AG 326 Agricultural Programs and Agencies

A review of the public agriculture programs and agencies that provides services for agricultural producers. The objectives, organization, functions and services of these organizations.
Prerequisite: AG 310.

BUS 335 Business Management

Principles of business management including overview of major functions of management such as planning, staffing, controlling, directing, and financing. Clarification of the decision-making function versus the operating function. Role of management in business -- qualifications and requirement.
Prerequisite: None.

BUS 309 Business Machines

A general survey of the business and office machines. Students will receive training in techniques, processes, operation and application of 10-key adding machine, full-keyboard adding machine, calculator, posting and accounting machines, card punch, and card verifier.
Prerequisite: None.

AG 502 Agricultural Business Practicum

Supervised learning experiences - learning experiences related to the instruction that require development beyond normal school hours and facilities - organized cooperatively between the school administration and selected agricultural industries or businesses. The student will gain practical experience under the supervision of agricultural businessmen and school personnel in an agricultural enterprise. Oral and written reports, field problems, and group discussions will be included.
Prerequisite: None.

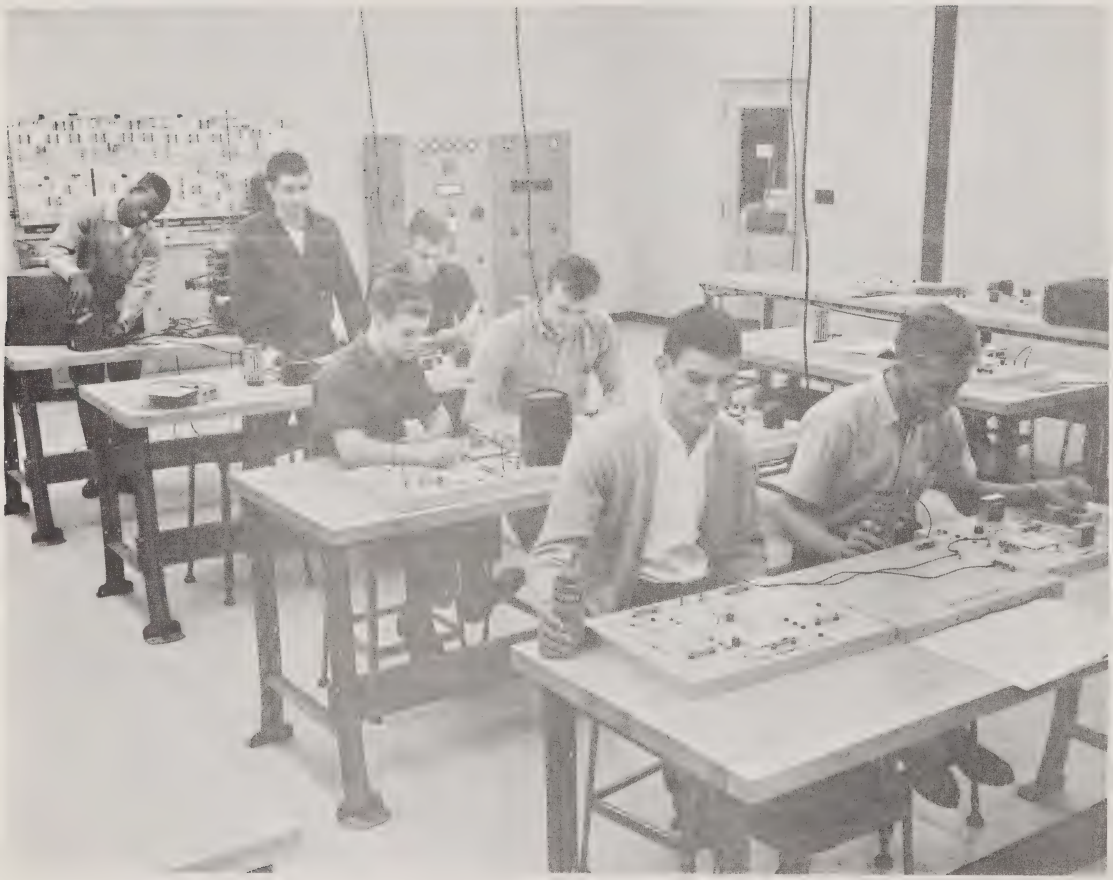
ELECTRONICS

PURPOSE OF CURRICULUM

Many opportunities exist for men and women with a technical education in electronics. This curriculum provides a basic background in electronic related theory with practical applications of electronics for business and industry. Courses are designed to develop competent electronics technicians who may take their place as an assistant to an engineer, or as a liaison between the engineer and the skilled craftsman.

JOB DESCRIPTION

The electronics technician will start in one or more of the following areas: research, design, development, production, maintenance or sales. He may be an assistant to an engineer, and engineering aide, laboratory technician, supervisor or equipment specialist. His training is similar to that of an engineer, but in less depth and more practical in application. He can function as a liaison between an engineer and the skilled craftsman.



ELECTRONICS TECHNOLOGY

ELECTRONICS TECHNOLOGY

Course Title			COURSE HOURS PER WEEK		QUARTER HOURS CREDIT
FIRST QUARTER			CLASS	LAB.	
MA	301	Technical Mathematics	5	0	5
PHY	301	Physics: Properties of Matter	3	2	4
ENG	301	Communicative Skills: Reading Improvement	2	0	2
DD	307	General Drafting	2	3*	3
ELEC	310	Direct Current Electricity	5	6	8*
			17	11	22
SECOND QUARTER					
MA	302	Technical Mathematics	5	0	5
PHY	302	Physics: Work, Energy, Power	3	2	4
ENG	302	Communicative Skills: English	3	0	3
ELEC	311	Alternating Current Electricity	5	6	8
			16	8	20
THIRD QUARTER					
MA	303	Technical Mathematics	5	0	5
ENG	303	Communicative Skills: Technical Writing	3	0	3
SOC	301	Human Relations	2	0	2
ELN	312	Electronics I	5	8	9
			15	8	19

* "Manipulative laboratory" involves development of skills and job proficiency. Credit of one quarter hour for each three hours of laboratory.

ELECTRONICS TECHNOLOGY

Course Title			COURSE HOURS PER WEEK		QUARTER HOURS CREDIT
FOURTH QUARTER			CLASS	LAB.	
MA	304	Technical Mathematics	3	0	3
PHY	304	Physics: Light and Sound	3	2	4
ENG	304	Communicative Skills: Speech	2	0	2
ELN	313	Electronics II	8	8	12
			16	10	21
FIFTH QUARTER					
ISc	301	Industrial Organization and Management	3	0	3
ELN	316	Transistor Applications	5	4	7
ELN	317	Communications and Ultra High Frequency	2	4	4
ELN	318	Special Circuitry	5	4	7
			15	12	21
SIXTH QUARTER					
SOC	302	Economics	3	0	3
ELN	319	Instrumentation	5	6	8
ELN	320	Circuit Analysis and Maintenance	5	6	8
			13	12	19

ELECTRONICS TECHNOLOGY

COURSE DESCRIPTION

MA 301 Technical Mathematics

The real number system is developed as an extension of natural numbers, integers, and rational numbers. Insight into the processes of arithmetic and algebra is provided. Additional topics include sets, equations, number bases, number lines, coordinate systems, trigonometry of the right triangle, vectors, dimensional analysis, and the derivative.
Prerequisite: None.

PHY 301 Physics: Properties of Matter

A fundamental course covering several basic principles of physics. The divisions included are solids and their characteristics, liquids in motion, gas laws and applications. Laboratory experiments and specialized problems dealing with these topics are part of this course.
Prerequisite: None.

ENG 301 Communicative Skills: Reading Improvement

A concentrated effort to improve the student's ability to comprehend what he reads by training him to read more rapidly and accurately. Special machines are used for class drill to broaden the span of recognition, and to train for comprehension in larger units. Reading faults of the individual are analyzed for improvement, and principles of vocabulary building are stressed.
Prerequisite: None.

DD 307 General Drafting

An introductory course in drafting for students needing a knowledge of drawing principles and practices for reading and describing objects in the graphic language. The student is expected to gain basic skills in drawing with instruments, lettering, geometrical constructions, freehand sketching, and describing objects orthographically with principal views. Freehand sketching and orthographic reading are to be emphasized.
Prerequisite: None.

ELEC 310 Direct Current Electricity

Basic electricity subjects include: structure of matter, electrical terminology and symbols, electron theory of current flow, magnets and magnetic fields. Rigorous mathematical analysis of direct current resistive circuits. Ohm's Law, Kirchhoff's Laws, Thevenin's Theorem, Norton's Theorem, the Superposition Principle and loop current method. Solution of complex resistive networks. Fundamental principles of inductors, capacitors, and time constants circuits are introduced.
Prerequisite: None.

MA 302 Technical Mathematics

Algebraic operations are applied to linear, quadratic, and polynomial functions and special equations of second degree. Complex numbers are introduced and the study of the derivative is continued. Selected applications involving rates of change, maxima and minima, approximation, areas, and volumes are considered.
Prerequisite: MA 301.

PHY 302 Physics: Work, Energy, Power

Major areas covered in this course are work, energy, and power. Instruction includes such topics as statics, forces, center of gravity, and dynamics. Units of measurement and their applications are a vital part of this course. A practical approach is used in teaching students the use of essential mathematical formulas.
Prerequisite: MA 301.

ENG 302 Communicative Skills: English

Designed to aid the student in the improvement of self-expression in business and technical composition. The approach is functional with emphasis of grammar, diction, sentence structure, punctuation, and spelling. Intended to stimulate students in applying the basic principles of English grammar in their day-to-day situations in industry and social life.
Prerequisite: None.

ELEC 311 Alternating Current Electricity

Alternating current and voltage: alternating current theory. Mathematical analysis is made of both sine and non-sine wave forms. Inductive reactance, capacitive reactance, and impedance characteristics of alternating current circuits are investigated. The use of vector and complex numbers in circuit impedance. Series and parallel resonant circuit conditions are compared and practical application of these conditions explained.
Prerequisite: ELEC 310, MA 301, PHY 301.

MA 303 Technical Mathematics

Ideas of algebra are used in a study of trigonometric, logarithmic and exponential functions. Selected applications of calculus reinforce this approach. Polar coordinates are introduced and their applications expanded. Complex numbers, vectors, coordinate systems and their applications constitute other areas of study.
Prerequisite: MA 302.

ENG 303 Communicative Skills: Technical Writing

The fundamentals of English are utilized as a background for the organization and techniques of modern technical writing. Exercises in developing typical technical reports, using writing techniques and grapnic devices, are completed by the students. Practical application in the preparation of a full-length technical report is required of each student at the end of the term.
Prerequisite: ENG 302.

SOC 301 Human Relations

Principles of interpersonal relations including a consideration of motivation, feelings, emotions, and learning with reference to their applications to on-the-job situations; personal and group dynamics and self-adjustment.
Prerequisite: None.

ELN 312 Electronics I

A treatment of electron tubes, semi-conductors and their associated circuitry; thermionic emission; diode, triode, tetrode and pentode characteristics. Theory of semi-conductor diode and transistor operation is studied in detail. Application of vacuum tubes and semi-conductors in power supplies, voltage amplifiers, power amplifiers, and the advantages and disadvantages of each considered.
Prerequisites: ELEC 310, MA 301, PHY 301.

MA 304 Technical Mathematics

A further study of analytical geometry, algebra, and calculus: the binomial expansion, arithmetic and geometric progressions, polynomial functions and methods of solution, integration techniques and use of integral tables, polar equations, and an introduction to solid analytical geometry.
Prerequisite: MA 303.

PHY 304 Physics: Light and Sound

A study of sound and wave motion and its technical applications to industry and related fields. Light and illumination. Principles of optical instruments. Practical aspects are emphasized.
Prerequisite: MA 301.

ENG 304 Communicative Skills: Speech

Technical speech to develop the speaking skills with emphasis on the dual role of communications as both a speaking and listening skill. Stress is placed on growth in poise and confidence of the student. Practice through individual speeches and group discussion. Recordings are made of the student's voice and used as an aid in speech development.
Prerequisite: ENG 302.

ELN 313 Electronics II

Design and analysis of vacuum tube and transistor oscillators, radio frequency analysis and intermediate frequency amplifiers. Frequency response, stage gain, distortion, noise characteristics and frequency stability will be explored.
Prerequisites: ELN 312, MA 303.

ISc 301 Industrial Organization and Management

Organizational structure for industrial management; operational and financial activities, including accounting, budgeting, banking, credit and industrial risk, forecasting of markets, selection and layout of physical facilities; selection, training and supervision of personnel as found in typical industrial organizations.
Prerequisite: None.

ELN 316 Transistor Applications

Transistor circuitry and design problems. Junction diodes, transistor triodes, tunnel and zener diodes with associated circuitry. Temperature variation, transit time, and frequency response are studied in detail.
Prerequisites: ELN 313, MA 304.

ELN 317 Communications and Ultra High Frequency

Application of previously studied circuits to the broad field of communications and ultra high frequency. Amplitude and frequency modulated transmitters, receivers, wave guides, cavity resonators; klystron, magnetron and traveling wave tubes are discussed.
Prerequisite: ELN 313.

ELN 318 Special Circuitry

The design and analysis of special circuitry: wave shaping, pulse techniques, broad-band amplifiers, diode switches, multivibrators, gates, magnetic amplifiers, chopper amplifiers, clipper and clamping circuits, synchro and servo systems, photo control devices, step counters and other specific application circuitry.
Prerequisites: ELN 314, ELN 316.

SOC 302 Economics

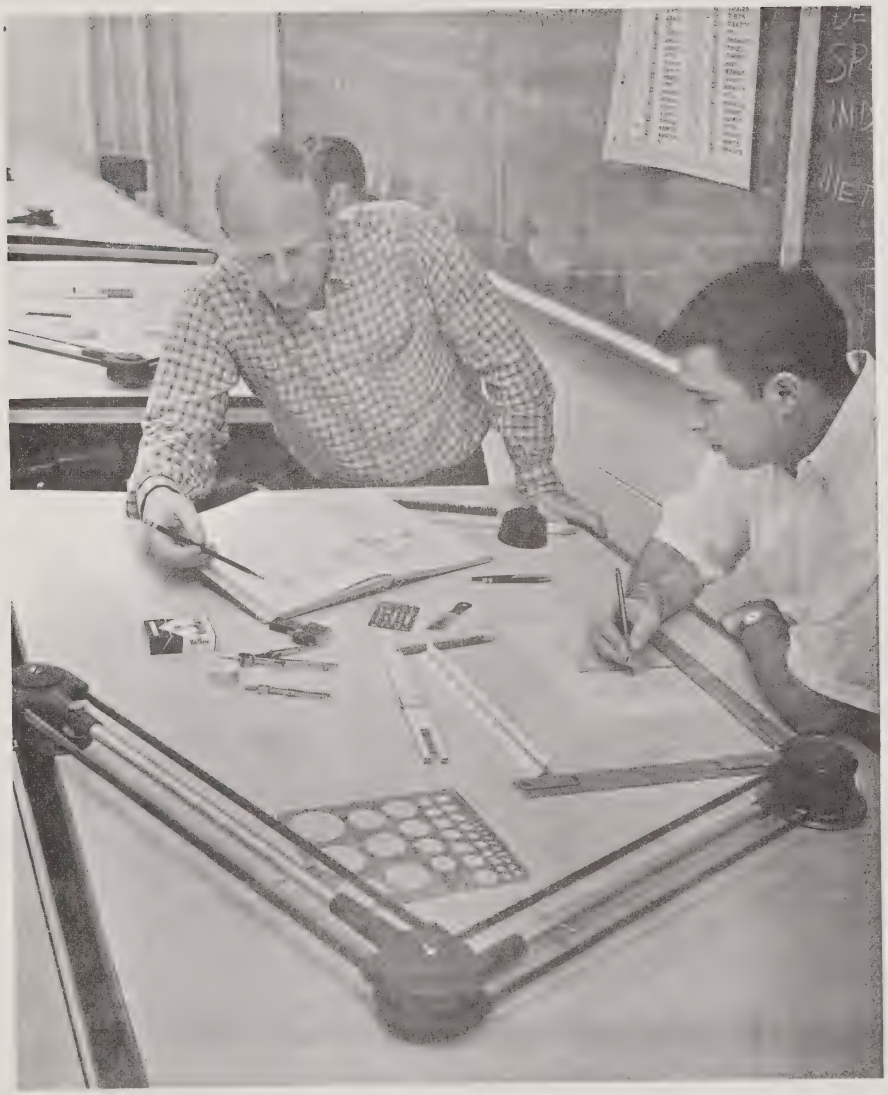
The fundamental principles of economics including the institutions and practices by which people gain a livelihood. Included is a study of the laws of supply and demand and the principles bearing upon production, exchange, distribution, and consumption both in relation to the individual en erprise and to society at large.
Prerequisite: None.

ELN 319 Instrumentation

A basic study of sensory devices for detecting changes in pressure, temperatures, sound, light and electricity; the associated circuitry and indicating devices.
Prerequisites: ELN 316, ELN 318.

ELN 320 Circuit Analysis and Maintenance

Systematic analysis of complex circuitry. Methods of locating and correcting malfunctions. Troubleshooting by voltage measurements; resistance measurements, and waveform observations. Schematic reading and interpretation.
Prerequisites: ELN 319, MA 304, PHY 304.



MECHANICAL DRAFTING & DESIGN

MECHANICAL TECHNOLOGY: DRAFTING & DESIGN

PURPOSE OF CURRICULUM

This curriculum guide was prepared for the purpose of outlining a training program for students of drafting and design technology. There are certain identifiable duties which are common to all technicians of this general classification and which comprise the basic areas of technical knowledge they need. This curriculum has been designed for training persons in the accepted performance of these basic duties that will be assigned, and to enable the individual student to become proficient in a short time after he becomes employed in the industry.

JOB DESCRIPTION

Mechanical drafting and design technicians are concerned with the preparation of drawings for design proposals, for experimental models and items for production use.

MECHANICAL TECHNOLOGY: DRAFTING AND DESIGN

Course Title			COURSE HOURS PER WEEK		QUARTER HOURS CREDIT
FIRST QUARTER			CLASS	LAB.	
DD	301	Technical Drafting	2	6*	4
MA	301	Technical Mathematics	5	0	5
ENG	301	Communicative Skills: Reading Improvement	2	0	2
PHY	301	Physics: Properties of Matter	3	2	4
MECH	301	Materials, Tools and Processes	2	2	3
			14	10	18
SECOND QUARTER					
DD	302	Technical Drafting	2	6*	4
MA	302	Technical Mathematics	5	0	5
ENG	302	Communicative Skills: English	3	0	3
PHY	302	Physics: Work, Energy, Power	3	2	4
MECH	302	Materials, Tools and Processes	2	2	3
			15	10	19
THIRD QUARTER					
DD	303	Technical Drafting	2	6*	4
MA	303	Technical Mathematics	5	0	5
ENG	303	Communicative Skills: Technical Writing	3	0	3
PHY	303	Physics: Electricity	3	2	4
MECH	303	Materials, Tools and Processes	2	2	3
			15	10	19

* "Manipulative laboratory" involves development of skills and job proficiency. Credit of one quarter hour for each three hours of laboratory.

MECHANICAL TECHNOLOGY: DRAFTING AND DESIGN

Course Title	COURSE HOURS PER WEEK		QUARTER HOURS CREDIT
FOURTH QUARTER	CLASS	LAB.	
DD 304 Technical Drafting	2	6*	4
DD 310 Descriptive Geometry	2	4	4
ENG 304 Communicative Skills: Speech	2	0	2
ELN 301 Industrial Controls	3	2	4
MECH 304 Metallurgy	3	2	4
	11	14	17
FIFTH QUARTER			
DD 305 Design Drafting I	2	6*	4
MECH 305 Strength of Materials	3	2	4
PHY 305 Hydraulics and Penumatics	2	4	4
DD 311 Mechanisms	3	2	4
	10	14	16
SIXTH QUARTER			
DD 306 Design Drafting II	4	6*	6
DD 312 Jig and Fixture Design	2	4	4
SOC 302 Economics	3	0	3
ISc 301 Industrial Organization and Management	3	0	3
SOC 301 Human Relations	2	0	2
	14	10	18

* "Manipulative laboratory" involves development of skills and job proficiency. Credit of one quarter hour for each three hours of laboratory.

COURSE DESCRIPTION

DD 301 Technical Drafting

Introduction to drafting and design practices and principles. Attainment of basic skills and techniques of drafting; use of drafting equipment; lettering; freehand orthographic and pictorial sketching; geometric construction; orthographic instrument drawing of principal views; and standards and practices of dimensioning and noting. Methods of reproducing, filing, and storing drawings are studied and the student is introduced to "working drawings."
Prerequisite: None.

MA 301 Technical Mathematics

The real number system is developed as an extension of natural numbers, integers, and rational numbers. Insight into the processes of arithmetic and algebra is provided. Additional topics include sets, equations, number bases, number lines, coordinate systems, trigonometry of the right triangle,vectors, dimensional analysis, and the derivative.
Prerequisite: None.

ENG 301 Communicative Skills: Reading Improvement

A concentrated effort to improve the student's ability to comprehend what he reads by training him to read more rapidly and accurately. Special machines are used for class drill to broaden the span of recognition, to increase eye coordination and word group recognition, and to train for comprehension in larger units. Reading faults of the individual are analyzed for improvement, and principles of vocabulary building are stressed.
Prerequisite: None.

PHY 301 Physics: Properties of Matter

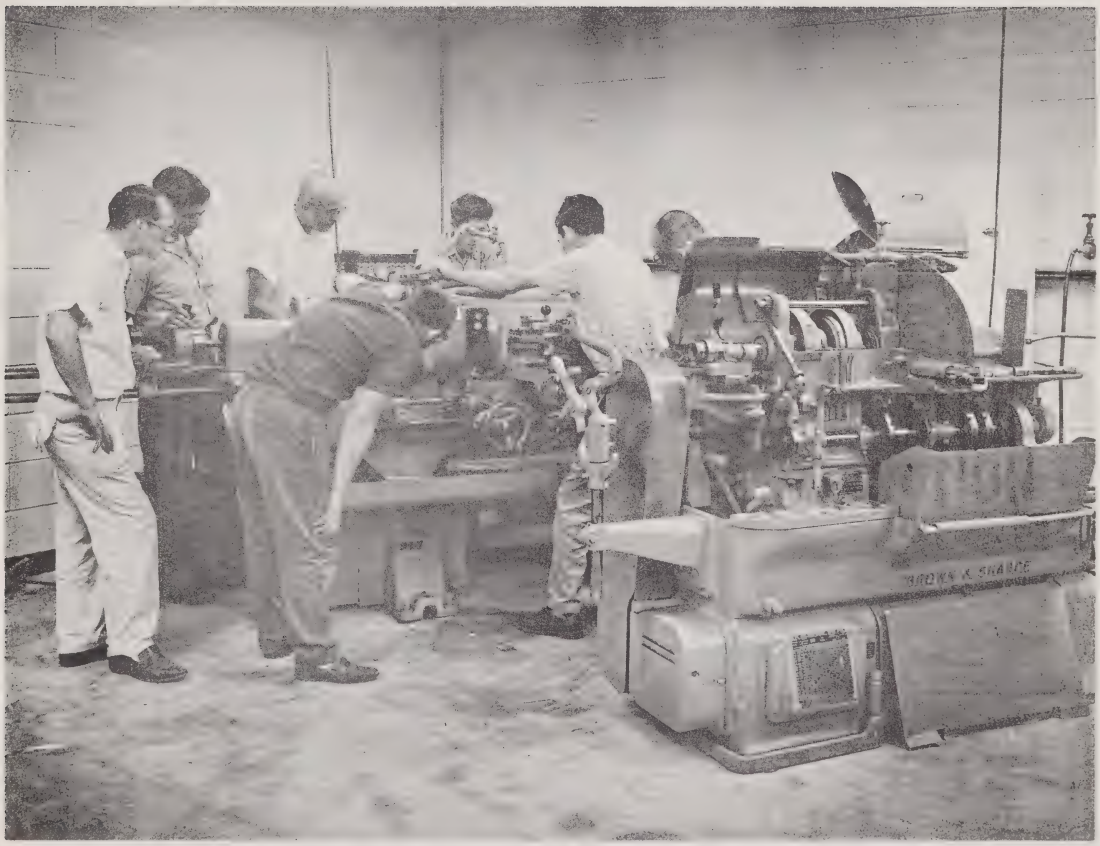
A fundamental course covering several basic principles of physics. The divisions included are solids and their characteristics, liquids in motion, gas laws and applications. Laboratory experiments and specialized problems dealing with these topics are part of this course.
Prerequisite: None.

MECH 301 Materials, Tools and Processes

An overall view of the methods and procedures used to transform raw materials into finished products. Characteristics of metals, woods and plastics and how these characteristics affect the selection and use of materials and methods of production in the manufacture of an object. Unit production system, sand casting, forging and allied processes, welding, sheet metal working processes, and woodworking processes constitute areas of study.
Prerequisite: None.

DD 302 Technical Drafting

The application of orthographic projection principles to the more complex drafting problems, primary and secondary auxiliary views, simple and successive revolutions, and sections and conventions will be studied. The introduction of the graphical analysis of space problems involving points, lines, planes, and a combination of these elements. Precision and limit dimensioning practices.
Prerequisite: DD 301.



MECHANICAL TECHNOLOGY - PRODUCTION

MECHANICAL TECHNOLOGY: DRAFTING AND DESIGN

COURSE DESCRIPTION

MA 302 Technical Mathematics

Algebraic operations are applied to linear, quadratic, and polynomial functions and special equations of second degree. Complex numbers are introduced and the study of the derivative is continued. Selected applications involving rates of change, maxima and minima, approximation, areas, and volumes are considered.
Prerequisite: MA 301.

ENG 302 Communicative Skills: English

Designed to aid the student in the improvement of self-expression in business and technical composition. The approach is functional with emphasis on grammar, diction, sentence structure, punctuation, and spelling. Intended to stimulate students in applying the basic principles of English grammar in their day-to-day situations in industry and social life.
Prerequisite: None.

PHY 320 Physics: Work, Energy, Power

Major areas covered in this course are work, energy, and power. Instruction includes such topics as statics, forces, center of gravity, and dynamics. Units of measurement and their applications are a vital part of this course. A practical approach is used in teaching students the use of essential mathematical formulas.
Prerequisite: PHY 301, MA 301.

MECH 302 Materials, Tools and Processes

Study of manufacturing processes involving machining of materials. The operation of lathes, grinders, drills, milling machines, shapers, planers, metal sawing machines, broaching machines, gear cutting machines, and finishing machines. Dimensional control and precision measuring as applied to machining of materials.
Prerequisite: MECH 301.

DD 303 Technical Drafting

Intersection and developments and their practical solutions. Where applicable, model solutions accompany the problems. The various techniques employed to produce and render isometric and oblique drawings, isometric, dimetric and trimetric projections, will be included.
Prerequisite: DD 302.

MA 303 Technical Mathematics

Ideas of algebra are used in a study of trigonometric, logarithmic and exponential functions. Selected applications of calculus reinforce this approach. Polar coordinates are introduced and their applications expanded. Complex numbers, vectors, coordinate systems and their applications constitute other areas of study.
Prerequisite: MA 302.

MECHANICAL TECHNOLOGY: DRAFTING AND DESIGN

COURSE DESCRIPTION

ENG 303 Communicative Skills: Technical Writing

The fundamentals of English are utilized as a background for the organization and techniques of modern technical writing. Exercises in developing typical technical reports, using writing techniques and graphic devices, are completed by the students. Practical application in the preparation of a full-length technical report is required of each student at the end of the term.
Prerequisite: ENG 302.

PHY 303 Physics: Electricity

Basic theories of electricity, types of electricity, methods of production, and transmission and transforming of electricity. Electron theory, electricity by chemical action, electricity by friction, electricity by magnetism, induction voltage, amperage, resistance, horsepower, wattage, and transformers are major parts of the course.
Prerequisites: PHY 301, MA 302.

MECH 303 Materials, Tools and Processes

Mass-production methods and design factors in areas of casting, forging, molding, pressing, drilling, boring, reaming, turning, grinding, milling, and surface finishing.
Prerequisite: MECH 302.

DD 304 Technical Drafting

Applications and constructions of charts, graphs, and nomographs in engineering and technical data. Screw threads, springs, keys, riviets, piping, and welding symbols, methods of representing and specifying will be covered. Basic mechanisms of motion transfer, gears and cams, will be studied and drawn with emphasis on methods of specifying, calculating, dimensions, and delineating.
Prerequisite: DD 303.

DD 310 Descriptive Geometry

Graphic analysis of space problems involving points, lines, planes, connectors, and a combination of these. Practical design problems will be stressed with analytical verification where applicable. Visualization shall be stressed on every problem.
Prerequisites: DD 302, MA 302.

ENG 304 Communicative Skills: Speech

Technical speech to develop the speaking skills with emphasis on the dual role of communications as both a speaking and listening skill. Stress is placed on growth in poise and confidence of the student. Practice through individual speeches and group discussion. Recordings are made of the student's voice and used as an aid in speech development.
Prerequisite: ENG 302.

MECHANICAL TECHNOLOGY: DRAFTING AND DESIGN

COURSE DESCRIPTION

ELN 301 Industrial Controls

Industrial controls is the study of modern methods of controlling machinery by electronic circuitry. Machinery controls and electronic mechanisms that automatically operate machines will be studied. Types of motors, generators, control signals and devices, thyratrons, gates, switches, and servomechanism circuits are major areas of study.
Prerequisite: PHY 303.

MECH 304 Metallurgy

Properties of metals and various methods of changing these properties, classifications of metals, powder metallurgy and factors contributing to production and selection of metals for use.
Prerequisite: None.

DD 305 Design Drafting I

Basic design is introduced in the study of motion transfer mechanisms as they relate to power trains. Principles of design sketching, design drawing, layout drafting, detailing from layouts, production drawings and simplified drafting practices constitute areas of study. Types and methods of specifying materials and workmanship are an integral part of the course.
Prerequisites: DD 304, MA 302, PHY 303.

MECH 305 Strength of Materials

Study of principles and analysis of stresses which occur within machine and structure elements subjected to various types of loads such as static, impact, varying and dynamic. Analyses of these stresses are made as applied to thin-walled cylinders and spheres, riveted and welding joints, beams, columns and machine components.
Prerequisites: PHY 303, MA 303.

PHY 305 Hydraulics and Pneumatics

The basic theories of hydraulic and pneumatic systems. Combinations of systems in various circuits. Basic designs and functions of circuits and motors, controls, electrohydraulic servomechanisms, plumbing, filtration, accumulators and reservoirs.
Prerequisite: PHY 302.

DD 311 MECHANISMS

Mathematical and drafting room solutions of problems involving the principles of machine elements. Study of motions of linkages, velocities and acceleration of points within a link mechanism; layout methods for designing cams, belts, pulleys, gears and gear trains.
Prerequisites: DD 304, MA 303, PHY 302.

MECHANICAL TECHNOLOGY: DRAFTING AND DESIGN

COURSE DESCRIPTION

DD 306 Design Drafting II

Research to solve a problem in design by consulting various manuals, periodicals, and through laboratory experiments. A written technical report, preliminary design sketches, layout drawings, detail drawings, assembly and sub-assembly drawings, pictorial drawings, exploded pictorial assembly, patent drawings and specifications are required as a part of the problem.
Prerequisites: DD 305, DD 310.

DD 312 Jig and Fixture Design

Commercial standards, principles, practices and tools of jig and fixture design. Individual project and design work to acquaint students with the types of jigs and fixtures and their design.
Prerequisites: DD 305, DD 311.

SOC 302 Economics

The fundamental principles of economics including the institutions and practices by which people gain a livelihood. Included is a study of the laws of supply and demand and the principles bearing upon production, exchange, distribution, and consumption both in relation to the individual enterprise and to society at large.
Prerequisite: None.

ISc 301 Industrial Organization and Management

Organizational structure for industrial management; operational and financial activities, including accounting, budgeting, banking, credit and industrial risk, forecasting of markets, selection and layout of physical facilities; selection, training and supervision of personnel as found in typical industrial organizations.
Prerequisite: None.

SOC 301 Human Relations

Principles of interpersonal relations including a consideration of motivation, feelings, emotions, and learning with reference to their applications to on-the-job situations; personal and group dynamics and self-adjustment.
Prerequisite: None.

MECHANICAL TECHNOLOGY - PRODUCTION

PURPOSE OF CURRICULUM

Manufacture, sale and operation of mechanical equipment, machines and machine tools is a large and diversified industry with excellent opportunities for those with aptitude and ability. A thorough technical training accompanied by a broad background of industrial management is essential if the individual is to advance to the better positions in the field. This curriculum provides basic background of mechanical and related theory with specific skills in the mechanical field. Students are trained in use of physical and metallurgical testing equipment. The mechanical courses are accompanied by management courses in plant management, time study, quality control, industrial organization, economics, and human relations.

JOB DESCRIPTION

A graduate of this program should qualify for an entry position in one of several manufacturing functions, Methods analysis, production planning, quality control, sales and service, labor co-ordinating, safety engineering, and cost estimating in metal industries are typical of situations where the graduate should function with a minimum of on-the-job training,

MECHANICAL TECHNOLOGY: PRODUCTION

Course Title			COURSE HOURS PER WEEK		QUARTER HOURS CREDIT
FIRST QUARTER			CLASS	LAB.	
DD	307	General Drafting	2	3*	3
MA	301	Technical Mathematics	5	0	5
ENG	302	Communicative Skills: English	3	0	3
PHY	301	Physics: Properties of Matter	3	2	4
MECH	306	Machine Processes	2	4	4
ENG	301	Communicative Skills: Reading Improvement	2	0	2
			17	9	21
SECOND QUARTER					
DD	308	General Drafting	2	3*	3
MA	302	Technical Mathematics	5	0	5
ENG	304	Communicative Skills: Speech	2	0	2
PHY	302	Physics: Work, Energy, Power	3	2	4
MECH	307	Machine Processes	2	4	4
SOC	301	Human Relations	2	0	2
			16	9	20
THIRD QUARTER					
MA	303	Technical Mathematics	5	0	5
PHY	303	Physics: Electricity	3	2	4
ENG	303	Communicative Skills: Technical Writing	3	0	3
MECH	308	Machine Processes	2	4	4
CHEM	301	Chemistry	3	2	4
			16	8	20

* "Manipulative laboratory" involves development of skills and job proficiency. Credit of one quarter hour for each three hours of laboratory.

MECHANICAL TECHNOLOGY: PRODUCTION

Course Title	COURSE HOURS PER WEEK		QUARTER HOURS CREDIT
FIRST QUARTER	CLASS	LAB.	
MECH 309 Machine Processes	2	4	4
MECH 310 Physical Metallurgy	3	2	4
ELEC 301 Electrical Machinery	3	0	3
MECH 312 Practical Automation	3	2	4
PHY 306 Applied Mechanics	5	0	5
	16	8	20
FIFTH QUARTER			
MECH 311 Physical Metallurgy	3	2	4
PHY 305 Hydraulics and Pneumatics	2	4	4
DD 311 Mechanisms	3	2	4
MECH 305 Strength of Materials	3	2	4
ISc 302 Quality Control	3	2	4
	14	12	20
SIXTH QUARTER			
ISc 301 Industrial Organization and Management	3	0	3
DD 312 Jig and Fixture Design	2	4	4
ISc 309 Plant Layout	3	2	4
MECH 313 Production Planning	3	0	3
ISc 303 Motion Study	3	2	4
SOC 302 Economics	3	0	3
	17	8	21
ELECTIVES			
MECH 314 Tool Engineering	3	0	3
ISc 304 Value Analysis	2	2	3
PHY 307 Control Systems	2	4	4

MECHANICAL TECHNOLOGY: PRODUCTION

COURSE DESCRIPTIONS

MECH 310 Physical Metallurgy

Introductory course in metallurgy. Analysis of the structure of metals and alloys, atomic structure, nuclear structure, and nuclear reactions. Solid (crystalline) structures, methods of designating crystal planes; liquid and vapor phases; phase diagrams; and alloy systems.
Prerequisite: CHEM 301.

ELEC 301 Electrical Machinery

A course in the basic understanding and application of electricity to modern industrial machinery. Included is a study of direct current motors, motor controls and protecting devices, transformers, and the industrial applications of this equipment.
Prerequisite: PHY 303.

MECH 312 Practical Automation

A comprehensive study of automation as it is interpreted and practiced by American industry of today. The fundamentals of automation and its effects in industrial productivity, labor supply and demand; equipment and processes. Students will solve problems encountered while installing an automated system.
Prerequisite: None.

PHY 306 Applied Mechanics

Concepts and principles of statics and dynamics. Parallel concurrent and nonconcurrent force systems in coplanar and noncoplanar situations. Concepts of centroids and center of gravity, moments of inertia, fundamentals of kinetics, and kinematics of velocity and motion.
Prerequisites: MA 303, PHY 302.

MECH 311 Physical Matallurgy

Properties of metals and alloys, the reactions of metals, diffusion, carburizing, metal bonding and homogenization; recrystallization and grain growth, age hardening, nitriding, internal oxidation; heat treatment of steel; laboratory experiments and demonstrations.
Prerequisite: MECH 310.

PHY 305 Hydraulics and Penumatics

The basic theories of hydraulic and pneumatic systems. Combinations of systems is various circuits. Basic designs and functions of circuits and motors, controls, electrohydraulic servomechanisms, plumbing, filtration, accumulators and reservoirs.
Prerequisite: PHY 302.

COURSE DESCRIPTIONS

DD 311 Mechanisms

Mathematical and drafting room solutions of problems involving the principles of machine elements. Study of motions of linkages, velocities and acceleration of points within a link mechanism; layout methods for designing cams, belts, pulleys, gears and gear trains.
Prerequisites: DD 308, MA 302.

MECH 305 Strength of Materials

Study of principles and analysis of stresses which occur within machine and structure elements subjected to various types of loads such as static, impact, varying and dynamic. Analyses of these stresses are made as applied to thin-walled cylinders and spheres, rivited and welded joints, beams, columns and machine components.
Prerequisites: PHY 302, MA 302.

ISc 302 Quality Control

Principles and techniques of quality control and cost saving. Organization and procedure for efficient quality control. Functions, responsibilities, structure, costs, reports, records, personnel and vendor-customer relationships in quality control. Sampling inspections, process control and tests for significance.
Prerequisite: None.

ISc 301 Industrial Organization and Management

Organizational structure for industrial management; operational and financial activities, including accounting, budgeting, banking, credit and industrial risk, forecasting of markets, selection and layout of physical facilities; selection, training and supervision of personnel as found in typical industrial organizations.
Prerequisite: None.

DD 312 Jig and Fixture Design

Commercial standards, principles, practices and tools of jig and fixture design. Individual project and design work to acquaint students with the types of jigs and fixtures and their design.
Prerequisite: DD 308

ISc 309 Plant Layout

A practical study of factory planning with emphasis on the most efficient arrangements of work areas to achieve lower manufacturing cost. Layouts for small and medium-sized plants, layout fundamentals, selection of production equipment and materials handling equipment. Effective management of men, money and materials in a manufacturing operation.
Prerequisites: MECH 309, DD 308.

MECH 313 Production Planning

Day-to-day plant direction; forecasting, product planning and control, scheduling, dispatching, routing, inventory control. Case histories are discussed in the classroom, and course of corrective action are developed.
Prerequisites: MECH 309, DD 308.

COURSE DESCRIPTIONS

DD 307 General Drafting

An introductory course in drafting for students needing a knowledge of drawing principles and practices for reading and describing objects in the graphic language. The student is expected to gain basic skills in drawing with instruments, lettering, geometrical constructions, freehand sketching, and describing objects orthographically with principal views. Freehand sketching and orthographic reading are to be emphasized.
Prerequisite: None.

MA 301 Technical Mathematics

The real number system is developed as an extension of natural numbers, integers, and rational numbers. Insight into the processes of arithmetic and algebra is provided. Additional topics include sets, equations, number bases, number lines, coordinate systems, trigonometry of the right triangle, vectors, dimensional analysis, and the derivative.
Prerequisite: None

ENG 302 Communicative Skills: English

Designed to aid the student in the improvement of self-expression in business and technical composition. The approach is functional with emphasis on grammar, diction, sentence structure, punctuation, and spelling. Intended to stimulate students in applying the basic principles of English grammar in their day-to-day situations in industry and social life.
Prerequisite: None

PHY 301 Physics: Properties of Matter

A fundamental course covering several basic principles of physics. The divisions included are solids and their characteristics, liquids in motion, gas laws and applications. Laboratory experiments and specialized problems dealing with these topics are part of this course.
Prerequisite: None.

MECH 306 Machine Processes

An introductory course designed to acquaint the student with basic hand tools, safety procedures and machine processes of our modern industry. It will include a study of measuring instruments, characteristics of metals and cutting tools. The student will become familiar with the lathe family of machine tools by performing selected operations such as turning, facing, threading, drilling, boring, and reaming.
Prerequisite: None.

ENG 301 Communicative Skills: Reading Improvement

A concentrated effort to improve the student's ability to comprehend what he reads by training him to read more rapidly and accurately. Special machines are used for class drill to broaden the span of recognition, to increase eye coordination and word group recognition, and to train for comprehension in larger units. Reading faults of the individual are analyzed for improvement, and principles of vocabulary building are stressed.
Prerequisite: None

COURSE DESCRIPTION

DD 308 General Drafting

The student continues the study of orthographic projection with applications to orthographic instrument drawing. Dimensioning procedures and practices are emphasized and the student is introduced to the "working drawing." Methods of describing complex objects with auxiliary views and/or sections and conventions are taught.
Prerequisite: DD 307.

MA 302 Technical Mathematics

Algebraic operations are applied to linear, quadratic, and polynomial functions and special equations of second degree. Complex numbers are introduced and the study of the derivative is continued. Selected applications involving rates of change, maxima and minima, approximation, areas, and volumes are considered.
Prerequisite: MA 301.

ENG 304 Communicative Skills: Speech

Technical speech is to develop the speaking skills with emphasis upon the dual role of communications as both a speaking and listening skill. Stress is also placed upon the growth in poise and confidence on the part of the student. Practice is provided through individual speeches and group discussion. Recordings are made of the student's voice and used as an aid in speech development.
Prerequisite: None.

PHY 302 Physics: Work, Energy, Power

The major areas covered in this course are work, energy, and power. Instruction includes such topics as statics, forces, center of gravity, and dynamics. Units of measurement and their applications are a vital part of this course. A practical approach is used in teaching students the use of essential mathematical formulas.
Prerequisites: PHY 301, MA 301.

MECH 307 Machine Processes

Advanced operations on lathe, drilling, boring and reaming machines. Milling machine theory and practice. Thorough study of the types of milling machines, cutters, jog and fixture devices, and the accessories used in a modern industrial plant. Safety in the operational shop is stressed.
Prerequisite: MECH 306.

SOC 301 Human Relations

Principles of interpersonal relations including a consideration of motivation, feelings, emotions, and learning with reference to their applications to on-the-job situations; personal and group dynamics and self-adjustment.
Prerequisite: None.

COURSE DESCRIPTION

MA 303 Technical Mathematics

Ideas of algebra are used in a study of trigonometric, logarithmic and exponential functions. Selected applications of calculus reinforce this approach. Polar coordinates are introduced and their applications expanded. Complex numbers, vectors, coordinate systems and their applications constitute other areas of study.
Prerequisite: MA 302.

PHY 303 Physics: Electricity

Basic theories of electricity, types of electricity, methods of production, and transmission and transforming electricity. Electron theory, electricity by chemical action, electricity by friction, electricity by magnetism, induction voltage, amperage, resistance, horsepower, wattage, and transformers are major parts of the course.
Prerequisites: PHY 301, MA 302.

ENG 303 Communicative Skills: Technical Writing

The fundamentals of English are utilized as a background for the organization and techniques of modern technical writing. Exercises in developing typical technical reports, using writing techniques and graphic devices, are completed by the students. Practical application in the preparation of a full-length technical report is required of each student at the end of the term.
Prerequisite: ENG 302.

MECH 308 Machine Processes

Modern machine tools of industry. Theory and practice with shaper, slotter, planer, turret lathe, screw machine, grinding and finishing machines. Gear design and the processes of gear manufacturing.
Prerequisite: MECH 307.

CHEM 301 Chemistry

Study of the physical and chemical properties of substances; chemical changes; elements, compounds, gases, chemical combinations; weights and measurements; theory of metals; acids, bases, salts, solvents, solutions, and emulsions. In addition, study of carbohydrates; electrochemistry, electrolytes, and electrolysis in their application of chemistry to industry.
Prerequisite: None.

MECH 309 Machine Processes

Newer concepts of work handling and automatic machining process. Chipless production and new techniques in metal forming. Analysis of high-energy forming, ultrasonic machining, electrolytic metal removal, chemical milling; numerical controls and simplified building block numerical control systems.
Prerequisite: MECH 308.

MECHANICAL TECHNOLOGY: PRODUCTION

COURSE DESCRIPTION

ISc 303 Motion Study

Types of methods studies and their applications. Process charts, analysis sheets, time study, work simplification, skill and effort rating.
Prerequisite: None.

SOC 302 Economics

The fundamental principles of economics including the institutions and practices by which people gain a livelihood. Included is a study of the laws of supply and demand and the principles bearing upon production, exchange, distribution, and consumption both in relation to the individual enterprise and to society at large.
Prerequisite: None.

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